SEGA® COMPUTER

AUGUST ISSUE 1985

The Official Sega User Club Magazine

ARTICLES ON

RS232C
Machine Code

LOTS OF PROGRAMS INCLUDING

Rhonda's Dungeon
Dazzle
Sound Effect
Scheduler
Biorhythmns

INTRODUCTION

Dear Readers

With the start of a new year's subscription period we are introducing some new blood and some fresh ideas to the Sega User magazine.

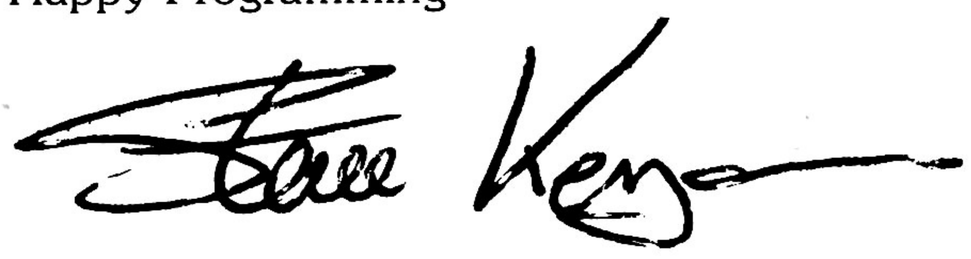
Michael Howard joins us on a full time basis and his lighthearted approach to programming and easy-to-read articles will be appreciated by all. Michael is, of course, a Sega celebrity and a legend in his own lunchtime being the author of such masterpieces as "Teach Yourself Basic Games Programming", and "More Than 50 Programs" to name but two.

Another new face on our magazine production team is Michael Greenan. Mike's claim to fame is practical appications and he was responsible for the burglar alarm article in our last issue and a useful little scheduling program in this issue.

You will also note with some glee that we are now attracting interest from third party software writers and judging by the advertisements placed there are some excellent new titles available.

Our theme for this year is less waffle — more useful programmes, and on that note I will stop waffling and close.

Happy Programming



Steve Kenyon
DIVISIONAL MANAGER

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The above are contact names and addresses for Sega Users Clubs. If you wish to have your club advertised write to Sega Users Club P.O. Box 2353, Auckland.

If you have set up a local area user's club and you would like us to publish the details concerning your club please send them to us and we will publish the information for no charge.

READER'S LETTERS

DEAR EDITOR,

Great Magazine but I can't get Candy Kid to work. I keep on getting a statement parameter error in 710. I have Checked and retyped this line at least 10 times and it still doesn't work. Is there something wrong with the program or is it just me?

L Shaw

EDITOR'S REPLY

As you can imagine it is very hard to work out what is causing an error without actually seeing the offending program. (Its sort of like being a doctor and diagnoising an illness without a patient! Very difficult. However, we do have some good news. The Candy Kid Program as published in the September 1984 Sega User's Club Magazine has no mistakes and if keyed in correctly will work. The only advice we can offer is that you check lines 720-770 carefully as they contain the data that is used on line 710. Somewhere in these lines you have probably got an I instead of a 1 of an O instead of a Ø.

DEAR EDITOR

I have a Zeta datarecorder that I have been running off batteries for the last three months. Once I found the correct levels (after a bit of fiddling) I have had no problems loading GRANDSTAND cassette programs. Last week I went out and brought an adaptor from my local GRANDSTAND computer dealer because I was getting sick and tired of replacing the batteries. I wasn't too sure that I had got the right adaptor as it has a strange plug on the end with four prongs but I think its the right one as it has your logo on it.

To cut a long story short when I plugged the data recorder into the adaptor the thing went crazy! It seems to have a desire to destroy every cassette I own. As soon as I placed a cassette into the machine and Press the LOAD/PLAY or RECORD/SAVE button the tape develops an intense disliking to the plastic case. The magnetic tape "escapes" from the plastic case and ends up caught up in the moving parts off the data recorder. As a First-time-computer-owner please tell me what is going on. Am I doing anything wrong? Is it the cassettes I am using? Is my problem caused by the data recorder or the adaptor? (I have gone back to using batteries and everything is working correctly now.)

R Whittle, Papatoetoe Auckland

P.S. Thank you for a very imformative magazine.

EDITORS REPLY

The 6 volt adaptors that GRANTSTAND is selling are Dual Polarity adaptors. This means that you can run any 6 volt appliance off the adaptor. There is four plugs on the end of the adaptor so that it will fit as many different appliances. The problems you are having are caused by the fact that your adaptor is on the wrong polarity. This means your data recorder is literally running backwards. (The tape is being unwound off the spools.) To stop this happening you must find the small black junction in the cable that runs from two ends apart (No don't unscrew them just pull gently and the junction will part.) To change the polarity of your adaptor to what it should be, turn one end of the junction over so that the pin labelled with the − sign goes socket marked with + and the pin marked + sign and the pin marked + goes to the — socket. Ie + to − on both pins. This will stop the data recorders destructive tendencies.

DEAR EDITOR,

We were wondering whether you could supply us with a program to round a number to two decimal places (EG for Dollars and Cents calculatios.)

Yours Sincerely
Bob Simmons

EDITORS REPLY

Just add line 20 to your program where ever you want a number displayed to two decimal places.

```
10 A=123.45678
20 PRINT INT ((A+.005)*100)/100
```

DEAR EDITOR,

We live on an isolated farm and we are having a bit of trouble getting equipment for our SEGA. Our "local" retailer is over 100 km away and doesn't seem to have a good selection of all the latest programs and hardware (He doesn't have the new joysticks. Are these availble yet?) Is it possible for us to purchase equipment directly from the club or from GRANDSTAND ? If so how do we go about doing so?

W Johnson

EDITOR'S REPLY

Unfortunately it is impossible to have dealers everywhere so it you are having trouble getting equipment if you want you can buy directly from the Users Club. To do this send a letter or use the order form in each magazine. Send this to:

SEGA USER'S CLUB
P.O. Box 2353
Auckland 1
New Zealand

Do not forget to enclose your name and address (So we know where to send everything and a cheque, money order card information for the total cost of the required equipment.

DEAR EDITOR,

I am wondering if you could help me out with a problem I have. Could you please explain how to make a sprite go across the screen and when it gets to a certain point letters start coming out the back of it, to form words. Please write back, any information will be gratefully accepted.

I would also like to take the chance to congratulate you on a fine effort you have been doing on the SEGA Magazine. It was greatly accepted in this household. I would like to say that the progam disection is very useful as it helps me a lot to understand the SEGA's basic commands more fully. Keep up the good work!!!

Yours Sincerely,
Alex Davidson
Upper Hutt

EDITOR REPLY

Here is a program that performs the tasks listed in your letter. (To change what comes up on the screen just alter A$)

```
10 D$="FFFFFFFFFFFFFFFF"
20 FOR A=0 TO 3:PATTERN S#A,D$:NEXT
30 SCREEN 2,2:CLS:MAG 1
40 A$="Hello this is a demo"
50 X=1
60 FOR A=0 TO 255
70 SPRITE 0,(A,90),0,6
80 IF A MOD 6=0 THEN CURSOR X*6,94:PRINT MID$(A$,X,1):X=X+1
90 NEXT
```

HIGH SCORE TABLE

This month we have some highscores which are almost unbelievable (But somebody next week will send us a letter with photographs which will make these scores look ridiculously small!) Please keep the highscores rolling in with the title of the cassette you would like if your score is the highest when you go to print. Note that if your highscore is beaten by somebody else you will not receive a prize.

Unfortunately due to lack of space in the last issue we were unable to publish the highscores so here they are.

Last months Mega-Sega-Space-Invaderologists were:

Alan Keen of Dunedin with an incredible — 11 on Champion Golf (Yes, but can you play the real game as well?)

HOLE:			
	1	Par 4	- 2
	2	Par 5	- 3
	3	Par 3	- 2
	4	Par 4	- 4
	5	Par 4	- 3
	6	Par 4	- 3
	7	Par 5	- 3
	8	Par 3	- 2
	9	Par 4	- 3
		Total	- 11

Dale Winchester of Rothesay Bay, Auckland with 999,999 on Monaco GP.

Robert Ashcroft of Beachaven, Auckland with 1,306,402 on Video Flipper.

B.A. Smaill of Dunedin with 1,141,650 (round 56!) on Flicky.

Gregory K Verhoef of Dunedin with 329,750 on Sinbad Mystery.

Alan Dodds of Christchurch with 874,860 on Borderline.

Carl Broadbridge of Renwick, Marlborough with 244,170 on Congo Bongo.

This months high scores are:

999,900 on Sinbad Mystery by L. Swanson of Wellington.

809,000 on Exerion by Daniel McVeagh of Huntly.

298,500 on Pop Flamer by Mark Timmermans of Papatoetoe Auckland.

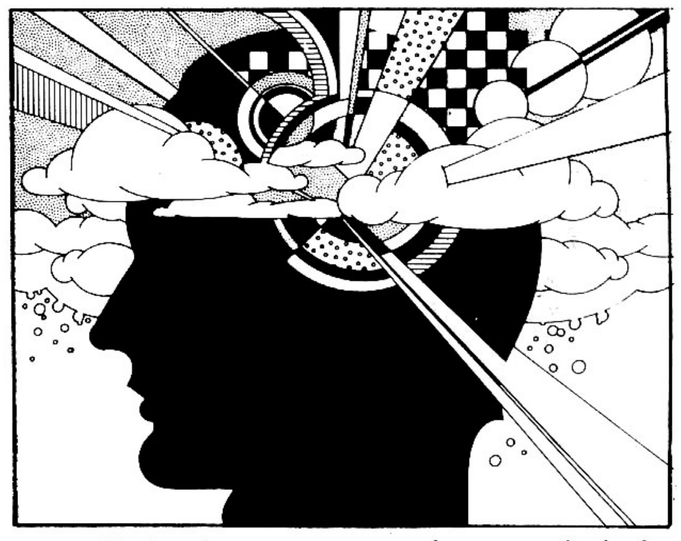
98,000 on Orgus by Mark Timmermans of Papatoetoe Auckland.

64,500 on N-sub by Rudy Clavel of Papatoetoe Auckland

-13 on Champion Golf by Darren Cooper of Wiri Auckland.

Keep the scores coming in and remember you MUST supply photographic verification of your highscore.

Biorhythmns



By Rod Cuckow

Want to find out how you are going to feel in about a week or so's time? Or want to join NASA, but don't want to go on the Physical test when you are feeling awful? ...

If you answered YES to one of the above questions then this programme is for you!! In fact, even if you didn't answer any of the above questions . . . this programme will still be of interest.

Here is what it does ... Firstly enter your birthday eg 03/09/65 ... in other words if your birthdate is less than the 10th then enter 01, 02 ... 09 etc. Same applies to your month of hatching. Next enter the month and year in which you want the biorhythms to be calculated eg 08/1985 ... note the 08. Now that this data is entered your biorhythm will be calculated for that month.

The result given will show three traces, one for Physical activity another for Emotional activity and the other for Intellectual activity ... When Physical is low you will feel weak, when high you will feel strong, when intellectual is low you won't feel like going on University Challenge, when high you'll feel like doing a PhD in Metaphysics etc etc ...

Any way you should find this programme of great interest ...!

```
10  REM
20  ERASE
30  SCREEN  1,1:CLS:COLOR  4,15
40  INPUT  "NAME  :-  ";N$:PRINT
50  CURSOR  0,2:PRINT  "DATE  OF  BIRTH    DD/M
M/YYYY  "
60  CURSOR  13,2:INPUT  B$
70  Y2=VAL(MID$(B$,7,4))
80  IF  Y2<1582  THEN  GOTO  830
90  M2=VAL(MID$(B$,4,2))
100  IF  M2>12  THEN  GOTO  870
110  D2=VAL(MID$(B$,1,2))
120  IF  D2>31  THEN  GOTO  900
130  IF  M2=2  AND  Y2 MOD  4=0  AND  D2=29    TH
EN  GOTO  930
140  IF  M2=2  AND  Y2 MOD  4<>0  AND  D2>28    T
HEN  GOTO  960
150  CURSOR  0,4:PRINT  "BIORHYTHM  FOR  MONT
H  AND  YEAR"
160  CURSOR  18,6:PRINT  "MM/YYYY"
170  CURSOR  16,6:INPUT  F$
180  M3=VAL(MID$(F$,1,2))
190  Y3=VAL(MID$(F$,4,4))
200  IF  Y3<Y2  THEN  GOTO  990
210  IF  Y3<=Y2  AND  M3<M2  THEN  GOTO  1020
220  GOSUB  1060:IF  F  THEN  FOR  I=0  TO  200:
NEXT:GOTO  20
230  IF  M3=2  AND  Y2 MOD  4=0  THEN  D=29
240  D9=VAL(MID$(B$,1,2))
250  M9=VAL(MID$(B$,4,2))
260  Y9=VAL(MID$(B$,7,4))
270  SCREEN  2,2:COLOR  3,1,,1:CLS
280  CURSOR  0,10:PRINT  "    BIORHYTHM  FOR  =
-  ";N$:PRINT
290  PRINT  "  DATE  OF  BIRTH    ";B$:PRINT
300  PRINT  "  BIORHYTHM  FOR  ";M$;"  ";MID$(
F$,4,4)
310  LINE  (255,110)-(9,110)
320  CURSOR  0,160:PRINT  "LOW"
330  CURSOR  0,55:PRINT  "HIGH"
340  CURSOR  0,106:PRINT  "0"
350  GOSUB  710
360  F1=T
370  PSET  (9,Y)
380  C=23
390  Y9=VAL(MID$(F$,4,4))
```

```
400  M9=VAL(MID$(F$,1,2))
410  GOSUB 710
420  FOR I=1 TO D
430  F2=T+I
440  GOSUB 750
450  CURSOR X+2,Y:PRINT "—"
460  GOSUB 770
470  NEXT
480  CURSOR X,Y:PRINT "  "
490  PSET (9,Y)
500  C=28
510  FOR I=1 TO D
520  F2=T+I
530  GOSUB 750
540  CURSOR X+2,Y:PRINT "+"
550  GOSUB 770
560  NEXT
570  CURSOR X,Y:PRINT "  "
580  PSET (9,Y)
590  C=33
600  FOR I=1 TO D
610  F2=T+I
620  GOSUB 750
630  CURSOR X+2,Y:PRINT "."
640  GOSUB 770
650  NEXT
660  CURSOR 0,170
670  PRINT "    Physical.  Emotional.  Intel
lectual."
680  PRINT "  ----------      +++++++++  " : CURS
OR 150,180:PRINT "..........................."
690  A$=INKEY$:IF A$="" THEN 690
700  GOTO 10
710  X$=""
720  IF M3=2 THEN X$="L"
730  IF X$="L" THEN T=365*(Y9)+31*(M9-1)+
INT((Y9-1)/4)-INT(3/4*(INT((Y9-1)/100)+1
)):RETURN
740  IF X$<>"L" THEN T=365*Y9+31*(M9-1)-I
NT(.4*M9+2.3)+INT(Y9/4)-INT(3/4*(INT(Y9/
100)+1)):RETURN
750  A=SIN(360*(ABS(F1-F2)/C-INT(ABS(F1-F
2)/C))*PI/180)
760  RETURN
770  H=A*7
780  X=I*8
790  Y=110-H*6
800  LINE (X,105)-(X,115)
810  RETURN
820  END
830  PRINT "INVALID INPUT calender change
d before that date.Year to be greater th
an 1582
        Press a key to continue"
840  A$=INKEY$:IF A$="" THEN 840
850  CURSOR 0,3:PRINT SPC(160)
860  GOTO 50
870  PRINT "INVALID INPUT There are only
12 monthsin the year
                    Press a key to continue"
880  A$=INKEY$:IF A$="" THEN 880
890  GOTO 850
900  PRINT "INVALID INPUT no month has mo
re than 31 days
                    Press a key to continue"
910  A$=INKEY$:IF A$="" THEN 910
920  GOTO 850
930  PRINT "INVALID INPUT February had 29
 days that year
                    Press a key to continue"
940  A$=INKEY$:IF A$="" THEN 940
```

```
950 GOTO 850
960 PRINT "INVALID INPUT
                              February only has
28 days
        Press a key to continue"
970 A$=INKEY$:IF A$="" THEN 970
980 GOTO 850
990 CURSOR 0,6:PRINT "INVALID INPUT that
 YEAR is before the YEAR of BIRTH
                                    Press a
key to continue"
1000 A$=INKEY$:IF A$="" THEN 1000
1010 GOTO 1040
1020 CURSOR 0,6:PRINT "INVALID INPUT tha
t MONTH is before theMONTH of BIRTH
                                    Press
a key to continue"
1030 A$=INKEY$:IF A$="" THEN 1030
1040 CURSOR 0,6:PRINT SPC(160)
1050 GOTO 150
1060 DATA January,31,February,28,March,3
1,April,30,May,31,June,30,July,31,August
,31,September,30,October,31,November,30,
December,31
1070 F=0:IF M3<1 OR M3>12 THEN PRINT"Wha
t?..Invalid month (1-12)!!":F=1:RETURN
1080 RESTORE 1060
1090 FOR I=1 TO M3:READ M$,D:NEXT
1100 RETURN
```

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Some examples of Machine Code using ROM routines . . .

Many people have been wondering how to program in machine code, and rightly so . . . you just can't beat it for speed and efficiency. Of course the main problem is the difficulty of learning the stuff. Well to clear things up and hopefully make life a little easier for those who ARE finding machine language a little hard to swallow, here are a few routines that are already in the ROM and how to use them with ease . . .

Firstly . . . What is a ROM routine? Well imagine this . . . when you type in a command such as . . .

LINE (10, 20)—(50, 60)

The computer thinks "Um this programmer wants to draw a line," the computer then takes the data that follows the word "LINE" (which in this case is 10, 20, 50 and 60). Now that it is armed with all the relevant data the computer calls (another way of saying executes) a small machine code program in it's ROM. The routine that is used actually does the drawing of the line. With machine code it is possible to by-pass all the analyzing that the computer has to do, by calling the routine yourself and supplying all the data, this leads to great speed. Well that just about explains what a ROM routine is. It is important to note that there are literally hundreds of routines in the ROM, things such as moving sprites, drawing circles, plotting points, saving a program to tape or disc etc etc the list is massive . . .

Now to explain how to use some of the ROM routines. The first one I'll demonstrate is the LINE routine. I may as well . . . because we can relate to it quite well . .

Okay, what data is needed for the routine? We have to know the coordinates for the line; ie where the line goes from, and to the what point, we'll stick to the coordinates used above, which are 10, 20, 50 and 60.. To use this data use the following machine code.

Mnemonics	**Hex data**	**Meaning**
LD D, &h14	16, 14	let d = &h14 (20 decimal)
LD E, &h0A	1E, 0A	let e = &h0A (10 decimal)
LD H, &h32	26, 32	let h = &h32 (50 decimal)
LD L, &h3C	2E, 3C	let 1 = &h3c (60 decimal)
LD A, &H01	3E, 01	let a = &h01 (1 decimal)
LD B, &h00	06, 00	let b = &h00 (0 decimal)

As the bit of information stands it'll do nothing noticable, just load a few of the machines 'registers' (a register is almost identical to a variable, you know . . . the things you use in BASIC eg: LET A=33 is similar to LD A, 33 "LET" is used in BASIC, "LD" is used in machine code).

The registers now contain the data needed to draw a line . . . the data is as follows . . .

Register	**Contents**	**Use**
D	&h14	Holds the start Y-coordinate
E	&h04	Holds the start X-coordinate
H	&h32	Holds the end Y-coordinate
L	&h3C	Holds the end X-coordinate
A	&h01	When set to '0' means erase a line When set to '1' means draw a line
B	&h00	When set to '0' means dot connection When set to '1' means side connection

Don't worry about the B-register just yet . . . but always set it to '0' as this is quicker if B is set to '1'.

Okay, now that we have the registers set up how do we use this info to draw the actual line? Well we use the 'CALL' instruction in machine code, and call the routine in the ROM. The routine in the ROM is at address &H39F1. If you have a disc drive the routine starts at &H009C.

Now to actually execute the program in the ROM . . . this is what we have . . .

Mnemonics	**Hex Data**	**Meaning**
LD DE, &H1404	11, 0A, 14	This takes the place of LD D and LD E
LD HL, &H3C32	21, 32, 3C	This takes the place of LD H and LD L
LD A, &H01	3E, 01	
LD B, &H00	06, 00	
CALL &H39F1	CD, F1, 39	Call the ROM routine
RET	C9	Return back to BASIC

NOTE: if you have the SF-7000 Disc Drive alter the CALL &H39F1 to CALL &H009C.

We now have a M/C program and it must now be stored somewhere in memory. I generally like to store my stuff at location &HF000 onwards. To store M/C it is best to use the POKE command thus we get...

```
PROGRAM 1

10 DATA 11,0A,14,21,32,3C,3E,01,06,00,CD,
F1,39,C9
20 FORA=&HF000TO&HF00D:READA$:POKEA,VAL(
"&h"+A$):NEXT
30 SCREEN 2,2:CLS:CALL&HF000
40 GOTO40
```

Lines 10 and 20 are known as 'Hex Loader' as the data held at line 10 is in hexadecimal and it is loaded into memory by line 20.

Now run this program . . . see what happens? You get a line!! WOW!! It may not seem very exciting at first but it has shown you how to use a ROM routine. Let's face it you have to start somewhere!!

Well now that that is done let's modify the program a little. How about creating a fancy little pattern on the screen by using the ROM routine just covered?!

Look at this BASIC program.

```
PROGRAM 2

10 SCREEN 2,2:CLS
20 FOR A=0 TO 255 STEP 3
30 LINE(128,90)-(A,0)
40 NEXT A
50 GOTO 50
```

As you can see the program isn't really all that fast . . . so why not speed it up with a bit of M/C?? Here is the M/C to do just that.

Mnemonics	**Hex date**	**Meaning**
LD DE, &H5A80	11, 80, 5A	Set data
LD HL, &H0000	21, 00, 00	DE, HL are coordinates of line
LD A, &H01	3E, 01	A, B are type of line
LD B, &H00	06, 00	
LD C, &H56	OE, 56	C is a counter
CALL &H39F1	CD, F1, 39	call the routine in the ROM
INC L	2C	L contains the end X coordinate
INC L	2C	this section is the same as LET L=L
INC L	2C	+3 ie: move X position along by 3
DEC C	0D	decrease counter by 1
JP NZ	C2, 0C, F0	if C is Not Zero then jump to FOOC
RET	C9	return back to BASIC

To store the program in memory use the following program.

```
PROGRAM 3

10 DATA 11,80,5A,21,00,00,3E,01,06,00,0E
,56,CD,F1,39,2C,2C,2C,0D,C2,0C,F0,C9
20 FOR A = &HF000 TO &HF016:READ A$:POKE
A,VAL("&h"+A$):NEXT
30 SCREEN 2,2:CLS
40 CALL &HF000
50 GOTO 50
```

Don't forget to alter the address to &H009C if you have the Disc Drive.

You should (when you RUN the program!!) see the same display as given by the program written in BASIC, but of course, it is much quicker to produce in M/C.

In M/C you use a wierd way of looping. Take this bit of BASIC.

10 FOR A = 1 TO 100: NEXT A

To do this in M/C you do this.

LD A, 100	. . . set A to 100 (Note this is decimal)
DEC A	. . . decrease A by 1 ie; A=A-1
JP NZ	. . . if A is Not Zero then jump back to DEC A
RET	. . . return back to BASIC

What happens is whenever you decrement any register (ie; A, B, C, D, E, H or L) a check is made automatically to see if it equals 0 or not, and that is how the loop is implemented in the above two lots of M/C. Understand?? Good!!

Now onto something a little different . . . moving of sprites.

If you found drawing lines a little difficult then you should find this bit very easy AND a lot more useful!! Loops will be used so it is fairly important you get to grips with them.

Firstly what data do we need. . .? Here it is. . .

A register holds sprite plane number (range 0-31 decimal)
D register holds Y-coordinate of spirte (range 0-191 decimal)
E rigister holds X-coordinate of sprite (range 0-255 decimal)
Address of routine is &H4292 (&H00BA on SF-7000)

Try this program in BASIC

PROGRAM 4

```
10 SCREEN 2,2:CLS
20 PATTERN S#0,"828080E69292929297"
30 FOR A=191 TO 0 STEP -1:SPRITE 0,(128,
A),0,1:NEXT A:GOTO 30
```

When you RUN the program you see a sprite travel up the centre of the screen albeit a little slowly!!

Now try this . . . it will really show off the speed of M/C!!

Mnemonics	Hex data	Meaning
LD A, &H00	3E, 00	set sprite plane
LD DE, &HC080	11, 80, C0	set original coordinates of sprite
CALL &H4292 ←	CD, 92, 42	place sprite on screen
DEC D	15	D = D − 1, ie move sprite up screen
JP NZ >	C2, 05, F0	if E is Not Zero then jump to &HF005
RET	C9	return to BASIC

PROGRAM 5

```
10 DATA 3E,00,11,80,C0,CD,92,42,15,C2,05
,F0,C9
20 FOR A=&HF000 TO &HF00C:READ A$:POKE A
,VAL("&h"+A$):NEXT A
30 PATTERN S#0,"828080E69292929297":SPRITE
0,,0,1:SCREEN 2,2:CLS
40 CALL &HF000:GOTO 40
```

RUN it and you will see a sprite move on the screen . . . the only problem is that it is so fast you can only see the sprite flash!! (to go from the bottom of the screen to the top takes about 1/20th of second. . (, so we need to slow it down. Make these following modifications.

Mnemonics	**Hex data**	**Meaning**
LDA,00	3E, 00	
LD DE, &HC080	11, 80, C0	
CALL &H4292 ←	CD, 92, 42	small delay loop. The B-register
LD B, &HFF	06, FF	is used to count down from 255
DEC B ←	05	(&HFF) to 0 and when B reaches 0
JP NZ >	C2, 0A, F0	the loop ends, otherwise the
DEC D	15	computer jumps to address &HF00A
JP NZ >	C2, 05, F0	
RET	C9	

Now enter the following hex loader and program

PROGRAM 6

```
10 DATA 3E,00,11,80,C0,CD,92,42,06,FF,05
,C2,0A,F0,15,C2,05,F0,C9
20 FOR A=&HF000 TO &HF012:READ A$:POKE A
,VAL("&h"+A$):NEXT A
30 PATTERN S#0,"828080E69292929297":SPRITE
0,,0,1:SCREEN 2,2:CLS
40 CALL &HF000:GOTO 40
```

Now RUN the program and you will see a sprite ZOOM up the screen . . . and this is with a delay in it . . . As you can M/C is extremely quick!!

Hopefully this little section will show you a few of the in's and out's of M/C. To finish off I'll give you another few ROM routines and what they do.

Address		**Description**
Normal :	**Disc**	
&H39EE	&H0099	Dot plot on graphics screen . . . D hold Y coordinate, E holds X coordinate, if A holds 0 then erase dot, if A holds 1 then plot a dot.
&H4298	&H00AE	Set the colour of a sprite . . . A holds plane number (range 0-31 decimal), C holds colour (0-15 decimal).
&H4A2D	&H00F3	Print a character on the graphics screen . . . D holds Y position, E holds X position, A holds character code (range 32-255 decimal).
&H42D2	&H0165	Read in a character from the keyboard . . . similar to INKEY$ statement in BASIC. No data is sent to the routine . . . data is only read out. After CALLing the routine, the A register will hold the character that was pressed, eg if when you call the routine the 'Z' key is being pressed, the A register will hold 90 decimal.

Oh well that wraps things for the time being . . . Happy Progging!!

A Very Simple Shuffling Routine

Many people would like to be able to write a small program to shuffle cards the only problem is that many programs are slow and/or ineffective. Well hopefully this routine will help those who are having a little difficulty with such matters!

The program works as follows.

LINES 10-50 . . . sets up initial deck of cards. They are not shuffled at this stage.

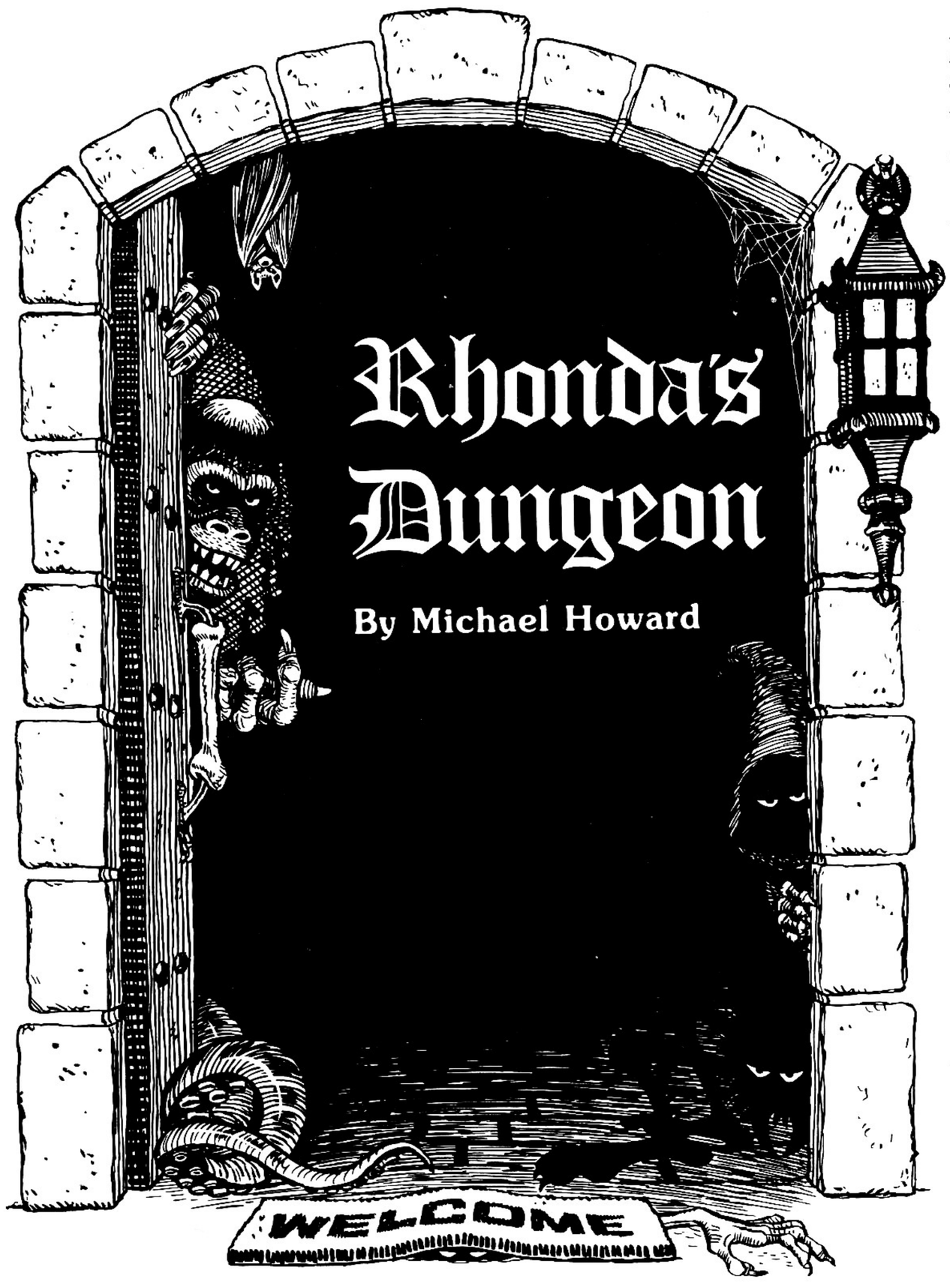
LINE 60 . . . tell the user to wait a moment whilst the computer shuffles.

LINES 80-110 . . . do the actual shuffling. It works by generating a random number, and selecting the card held at that point, it then swaps over two cards thus getting a random arrangement!! This is repeated a couple of times.

LINES 120-. . . prints out deck when you press a key.

Oh well that's it . . . I hope you find it useful.

```
10  DATA2,3,4,5,6,7,8,9,T,J,Q,K,A
20  DATASpades,Clubs,Diamonds,Hearts
30  DIMC$(52)
40  FORA=1TO52STEP13:RESTORE:FORB=0TO12:R
EADC$(A+B)
50  C$(A+B)=C$(A+B)+RIGHT$(STR$(AMOD4),1)
:NEXTB,A
60  CLS:X=RND(-1)
70  PRINT"Shuffling"
80  FORB=1TO2:FORA=1TO52
90  Z=INT(RND(8)*52)+1
100  T$=C$(A):C$(A)=C$(Z):C$(Z)=T$
110  NEXTA,B
120  FORA=1TO52
130  PRINT"Card#";A;TAB(12);LEFT$(C$(A),1
);"  of  ";:RESTORE20:FORI=0TOVAL(RIGHT$(C
$(A),1)):READA$:NEXTI:PRINTA$
140  IFINKEY$=""THEN140
150  NEXTA
```



Dungeon is an adventure fantasy game in which you must fight monsters, encounter thieves, empty chambers, trap doors, secret doors leading to corridors, grottos, vials of liquid which may heal or harm, teleport traps, maps, keys, stairways and pools. The dungeon is in two layers, and the object is to get from level one to level two and from level two out!!! With as much gold as possible! and I'll say it now it isn't at all easy!

After you RUN the program enter your name or a fantasy characters name (eg Bilbo or Frodo or Aragorn from 'The Lord of the Rings') to start your trip into fantasy. Then enter the level of difficulty. For level 1 you get a typical hit point value of 25, on level 2 about 15. When fighting, if a baddy hits you, your hit points (HP) are slowly wittled away. If your HP are zapped to zero you get wasted! Each monster encountered has differing strength and may be easy or extremely difficult to kill.

After a short pause you will be teleported into a random part of the dungeon. You now have a choice of commands . . . they are . . .

N)orth, S)outh, E)ast, W)est, U)p, M)ap, G)old, H)it points.

You can move North through the dungeon except if you are at the North wall or in an East-West corridor. Similarly for South, East and West . . . with their respective walls and corridors.

To move up you must be at a stairway AND have a key. To find a key you must first kill a random number of monsters. Also there is a different key for each level.

If you have found a map you can look at it whenever you like. Here is a key for the symbols on the map.

M-monster
O-empty chamber
?-thief or trap
C-grotto
UP-stairway
NS-North-South corridor
EW-East-West corridor
*-You

A '?' represents a thief or trapdoor . . . there is no way of knowing which is there short of entering the chamber. If you encournter a thief, you may surprise her and thus nick some gold, on the other paw she may surprise you and nab some of your gold off you! After you encounter a thief the chamber becomes empty.

If you activate a trap-door, you can fall through or catch yourself from falling. If you fall you lose gold and may die! If you are on level 1 you may fall through to level 2 (which is REALLY annoying!).

If you wish to know how many HP you have left press H. If you wish to know how much gold you have stolen then press G.

When it comes to combat with monsters you may fight or run. If you fight you swing your sword and hit every time. When a monster strikes there is a chance that it may miss . . . but some monsters, such as Purple People Easters, very rarely miss and are to be avoided!

The number of HP that you deplete from a monster increases with the number of monsters you have killed. So, generally, the more monsters you brutally destroy, the easier it will be to maim the next . . (Nice eh?!)

Several things happen in grottos. Often you find vials of liquid, they may be good or bad or have no affect at all. You can also meet Doom Spiders and Wizards but the worst you can meet is Wretched Rhonda. They all hit hard and are pretty hazardous to your health! If you are lucky you might meet the Wind Wizard. You can also find pools . . . but watch out as these may contain 'orrible Gill Monsters.

In corridors you may activate teleport traps, or encouter weak monsters.

If you die, there is a small chance that you may meet the Wind Wizard, and he will resurrect you, giving you a second chance. Your HP will be restored, and you will be given a limited number of turns to complete the quest. If you die again. YOU ARE ABSOLUTELY, COMPLETELY, UTTERLY AND IRRECOVERABLY DEAD!!!

If you complete the game you are given a score . . . thus.

SCORE	TITLE
-401 or less	cannon fodder
-101 to -1	serf
-100 to -1	apprentice
0 to 99	learner
100 to 199	soldier
200 to 599	knight
600 to 899	Paladin
900 to 1499	knight in pink armour
1500 or more	smart aren't you?

All-in-all, the program is an addictive and complex adventure. It will just squeeze into level III A BASIC. Those with level III B BASIC or Disc BASIC could add more monsters or more rooms. I was going to add poisonous astrally projected vapour rats . . . if one bites you, you must find a vial of healing potion inside a random number of goes or die. The reason I didn't add them is that the name took up too much memory . . . I hope you like it . . !!

```
10  DEFFNR(X)=INT(RND(8)*X):DIMA(8,8,2)
20  CLS:PRINT"Rhonda's  Dungeon"
30  DY=0:MD=1:GOSUB3000
40  MA=0:CA=0:G=500:M1=1:K=0:HI=20+FNR(15
)+1
50  H1=HI:INPUT"Name  >";A$
60  GOSUB70:GOSUB90:GOSUB340
70  BE=1
80  FORZZ=1TO200*BE:NEXT:RETURN
90  FORX=1TO8:FORY=1TO8:FORZ=1TO2:A(X,Y,Z
)=FNR(7)+1:NEXTZ,Y,X
100  H=FNR(3)+1
110  FORA=1TO2:FORN=1TOH:X=FNR(8)+1:Y=FNR
(8)+1:A(X,Y,A)=8:NEXTN,A
120  S=FNR(4)+3
130  FORA=1TO2:FORN=1TOS:X=FNR(8)+1:Y=FNR
(8)+1:A(X,Y,A)=9:NEXTN,A
140  RETURN
150  L1=L1-1
160  PRINT"You  go  up  the  stairs":GOSUB70
170  PRINT"The  key  opens  the  lock":GOSUB7
0
180  IFL1=0THEN270
190  MA=0:K=0:K4=FNR(4)+2:IFH1<HITHEN210
200  GOTO240
210  H1=HI
220  PRINT"You  feel  better":GOSUB70
230  PRINT"Your  hp  are  now":HI
240  PRINT:CB=CA+K4
250  PRINT"You  are  at  level  1":BE=4:GOSUB
80
260  GOTO370
270  PRINT"You  found  your  way  out  of  the
Dungeon  You  have";G;"  gold  coins":GOSUB2
80:GOTO840
280  GG=G+1
290  R=INT((GG*CA-7000+1)/M1)
300  PRINT:PRINT"Rating  is...";R
310  PRINT:IFG<=0THEN1470
320  PRINT"You  took";M1;"  turns  to  find  t
he  exit":PRINT"&  killed";CA;"  monsters."
330  RETURN
340  C=FNR(8)+1:D=FNR(8)+1
350  A(C,D,2)=1
360  L1=2:K4=FNR(4)+2
370  F$="  ":CLS
380  A=A(C,D,L1):GOSUB70
390  ONAGOSUB980,1940,1670,1670,1010,1180
,1190,1200,1300
400  IFTE=1THENTE=0:GOTO370
410  PRINT:IFH1<=0THENB00
420  IFDY=1THENMD=MD-1
430  IFDY=1ANDMD=0THENB00
440  IFF$="R"THEN370
450  PRINTA$;",what  now?":PRINT:PRINT"N)o
rth,  E)ast,  S)outh,  W)est,  U)p,  M)ap,
 G)old,  H)it  points"
460  M1$=INKEY$:IFM1$=""THEN460
470  M1=M1+1:TL=0:C1=C:D1=D
480  IFM1$="N"THEN570
490  IFM1$="E"THEN600
500  IFM1$="S"THEN630
510  IFM1$="W"THEN660
520  IFM1$="U"THEN690
530  IFM1$="M"THEN740
540  IFM1$="G"THEN760
550  IFM1$="H"THEN1520
560  BEEP2:GOTO410
570  IFA=7THEN780
580  IFD-1=0THEN880
590  D=D-1:GOTO370
```

```
600  IFA=6THEN790
610  IFC+1=9THEN900
620  C=C+1:GOTO370
630  IFA=7THEN780
640  IFD+1=9THEN910
650  D=D+1:GOTO370
660  IFA=6THEN790
670  IFC-1=0THEN920
680  C=C-1:GOTO370
690  CLS: IFA<>9THEN720
700  IFK=1THEN150
710  PRINT:PRINT"You cant go up the stair
s":PRINT"You have no key!!":GOSUB70:PRIN
T:GOTO410
720  PRINT"You're not at the stairs":GOSU
B70:GOTO410
730  GOTO410
740  CLS: IFMA=1THEN930
750  PRINT"You don't have a map":PRINT:GO
SUB70:GOTO410
760  CLS:PRINT"You have";G;" gold coins":
PRINT: IFKTHENPRINT"and a Key"
770  GOTO410
780  CLS:PRINT"You are in an East-West co
rridor":PRINT"You can only go East or We
st":PRINT:GOTO410
790  CLS:PRINT"You are in a North-South c
orridor":PRINT"You can only go North or
South":GOTO410
800  BB=2:GOSUB80:CLS: IFDY=1THEN2990
810  PRINT"Your hp have been zilched!!":P
RINT:G=0:PRINT"You have just died!!":BB=
5:GOSUB80
820  PRINT:W=FNR(6)+1: IFDY=0ANDW>=3THEN29
40
830  CLS:PRINT"You lost all your gold & w
ere...          another victim of Rhonda!!!"
:PRINT:PRINT:PRINT"Better luck next time
!":GOSUB280:PRINT
840  PRINT"Another go? (Y/N) "
850  INPUTF$: IFF$="Y"THEN870
860  END
870  CLS:GOTO20
880  CLS:PRINT"You are at the North wall"
890  PRINT"You can't pass through":PRINT:
PRINT"try again":GOTO410
900  CLS:PRINT"You are at the East wall":
GOTO890
910  CLS:PRINT"You are at the South wall"
:GOTO890
920  CLS:PRINT"You are at the West wall":
GOTO890
930  CLS:PRINT"Ye Map...Level:";L1
940  PRINT:FORG=1TO8:FORN=1TO8
950  IFC=NANDD=QTHENPRINT"*     ";:GOTO970
960  S1=A(N,Q,L1):ONS1GOSUB1310,1340,1320
,1320,1330,1350,1360,1370,1380
970  NEXTN:PRINT:NEXTQ:GOTO410
980  W=FNR(2)+1: IFW=2THEN1000
990  PRINT:PRINT"You are in a cold and da
mp":PRINT".....empty chamber":PRINT:RET
URN
1000 PRINT:PRINT"You are in a damp and m
isty":PRINT".....empty chamber":PRINT:R
ETURN
1010 CLS:PRINT"There is a theif in here"
:A(C,D,L1)=1:GOSUB70
1020 G4=FNR(500)/L1+1: IFG-G4<=0THENG4=G
1030 G4=INT(G4):Y=FNR(8)+1
1040 IFY<=3THEN1120
1050 PRINT:PRINT".....he surprises you"
```

```
:GOSUB70:PRINT"as he quickly passes you
he":PRINT"snatches...";G4;" gold coins":
PRINT
1060  G=G-G4
1070  IFMA=1THENRETURN
1080  MA=FNR(4)+1:IFMA<=2THENMA=1
1090  IFMA=1THEN1110
1100  RETURN
1110  GOSUB70:PRINT"You search the chambe
r  &":GOSUB70:PRINT"You find a map":RETUR
N
1120  PRINT:PRINT"You surprise the theif.
.":GOSUB70:PRINT"as he runs he drops.."
1130  G4=INT(FNR(400)/L1+1):PRINT"..";G4;
" gold coins"
1140  PRINT"You pick them up quickly":G=G
+G4
1150  MA=FNR(4)+1:IFMA<=2THENMA=1
1160  IFMA=1THEN1110
1170  RETURN
1180  CLS:PRINT:PRINT"You enter an..North
-South corridor":PRINT"Through a..secret
 door":PRINT:GOSUB1480:RETURN
1190  CLS:PRINT:PRINT"You enter an..East-
West corridor":PRINT"Through a..secret d
oor":PRINT:GOSUB1480:RETURN
1200  PRINT"You triggered a...trap door":
GOSUB70
1210  TD=FNR(4)+1*PL:IFTD>4THENPRINT"You
fell through":GOSUB70:GOTO800
1220  IFTD=4THEN1240
1230  PRINT:PRINT"But you caught yourself
":PRINT"and stopped your fall":RETURN
1240  IFL1=2THEN1290
1250  L1=L1+1:PRINT:K=1
1260  PRINT"You fell through to level 2..
and"
1270  G=0
1280  GOSUB70:PRINT:PRINT"You lost all yo
ur gold!!  ha ha!!":RETURN
1290  PRINT"You fell into a deep pit":PT=
1:GOSUB70:PRINT"But you didn't get hurt"
:PRINT:GOSUB70:PRINT"But in climbing out
":GOTO1270
1300  PRINT"You are at a stairway..Going
up":RETURN
1310  PRINT"O      ":=:RETURN
1320  PRINT"M      ":=:RETURN
1330  PRINT"?      ":=:RETURN
1340  PRINT"C      ":=:RETURN
1350  PRINT"NS     ":=:RETURN
1360  PRINT"EW     ":=:RETURN
1370  GOTO1330
1380  PRINT"UP     ":=:RETURN
1390  H=1:O=9:W=8:B=0:E=5:R=14:C=0:PR=0:G
OTI1030
1400  RETURN
1410  GOSUB70
1420  K=1:PRINT:PRINT"You look to the gro
und....":PRINT"and find a key":GOSUB70:R
ETURN
1430  GOSUB1420
1440  GOTO480
1450  IFCA=CBTHEN1410
1460  RETURN
1470  PRINT"You killed";CA;" monsters":PR
INT"....in";M1;" turns":RETURN
1480  PRINT"The door closes & locks behin
d you":GOSUB70
1490  W=FNR(8)+1:IFW>=7THEN1540
1500  W=FNR(8)+1:IFW=8THEN1560
```

```
1510  RETURN
1520  CLS:PRINT"You  have";H1;"  hp"
1530  GOTO410
1540  W=FNR(18)+1:FORAA=1TOW:READMS$,HP,H
M:NEXT:RESTORE:PRINT:PRINT"There is some
thing":PRINT"in this corridor..":GOSUB70
1550  PRINT:GOTO1720
1560  TE=1:TL=1
1570  IFK=1THEN1600
1580  K=1:PRINT:PRINT"You notice a shiny
object..":PRINT"...at your feet":GOSUB70
1590  PRINT"You pick it up and find that"
:PRINT"it is a Key...":GOSUB70
1600  PRINT:PRINT"But you weren't careful
..":GOSUB70:PRINT"You activated a trap":
GOSUB70
1610  C=FNR(8)+1:D=FNR(8)+1:BB=5:GOSUB80:
CLS
1620  PRINT"You  suddenly  feel  dizzy,&  pas
s  out"
1630  PRINT:BB=2:GOSUB80:GOSUB1650
1640  PRINT"When  you  woke  up..you  find":P
RINT"That  you  are  now  in  an  unknown  area
":BB=5:GOSUB80:RETURN
1650  FORAA=1TO100:CURSORFNR(34),23:PRINT
"*":NEXT
1660  GOSUB70:CLS:RETURN
1670  IFA=4THEN1690
1680  W=FNR(18)+1:GOTO1700
1690  W=FNR(12)+6
1700  FORAA=1TOW:READMS$,HP,HM:NEXT:RESTO
RE
1710  PRINT:PRINT"There  is  something":PRI
NT"In  this  chamber..":GOSUB70
1720  PRINT"Beware.....":GOSUB70
1730  PRINT"It's  a....":MS$;"...":GOSUB70
1750  GOTO2290
1760  DATA  Purple  People  Eater,10,25
1770  DATA  Ghoul,5,10
1780  DATA  Minotaur,4,15
1790  DATA  Lich,9,25
1800  DATA  Kobold,2,4
1810  DATA  Golem,4,20
1820  DATA  Nasty  Imp,5,10
1830  DATA  Goblin,3,7
1840  DATA  Putrid  Orc,1,3
1850  DATA  Skeleton,1,2
1860  DATA  Ghost,3,10
1870  DATA  Vampire  Bat,3,6
1880  DATA  Green  Slime,3,17
1890  DATA  Big  Spider,3,10
1900  DATA  Vampire  Plant,1,10
1910  DATA  Shadow,2,10
1920  DATA  Giant  Rat,1,2
1930  DATA  Spectre,8,20
1940  PRINT"You  found  a.."PRINT"a hidden
  grotto":GOSUB70
1950  PRINT:GOSUB2070:IFH1<=0THENRETURN
1960  W=FNR(9)+1
1970  GOSUB70:IFW>3THENPRINT:PRINT"The pl
ace  seems  empty":RETURN
1980  GOSUB70:GOSUB2280
1990  GOSUB70:PRINT"But  wait..before you
proceed":GOSUB70:PRINT
2000  PRINT"You  hear  a  noise  in  the  dista
nce":GOSUB70
2010  PRINT"Cautiously  you  walk  towards  t
he  sound"
2020  BB=3:GOSUB80:W=FNR(4)+1:IFHI<H1THEN
2040
2030  IFW=1THEN2730
```

```
2040  IFW=2THEN2810
2050  IFW=4ANDL1=2THEN3070
2060  GOTO2840
2070  PRINT:PRINT"You look around...":GOS
UB70
2080  V=FNR(7)+1
2090  IFV>=5THEN2110
2100  RETURN
2110  PRINT"On the ground,is a vial":BB=2
:GOSUB80:PRINT"You pick it up and see":P
RINT"it contains....a liquid":PRINT:PRIN
T"Would you like a drink? (Y/N)"
2120  DL=FNR(6)+1
2130  D$=INKEY$:IFD$<>"Y"ANDD$<>"N"THEN21
30
2140  IFD$="Y"THEN2160
2150  RETURN
2160  PRINT:PRINT"You take a sip..":BB=2:
GOSUB80:CLS
2170  IFDL>=3THEN2240
2180  IFDL=2THEN2270
2190  H3=FNR(6)+1+PL:H1=H1-H3
2200  PRINT"You feel wierd.":GOSUB70:GOSU
B70
2210  IFH1<=0THENRETURN
2220  PRINT:PRINT"It was a Death Potion":
PRINT"Which drained your hp"
2230  RETURN
2240  H3=FNR(10)/(PL+1)+(6/PL):H1=H1+H3
2250  PRINT"It was a White potion":PRINT"
it increases your hp by";H3
2260  RETURN
2270  PRINT"The potion had no effect":RET
URN
2280  GOSUB70:PRINT:RETURN
2290  PRINT:W=FNR(4)+1
2300  IFW<=2THEN2320
2310  GOSUB70:GOSUB2510
2320  IFH1<=0THENRETURN
2330  PRINT:PRINT"Do you F)ight or R)un?"
2340  F$=INKEY$:IFF$<>"F"ANDF$<>"R"THEN2340
2350  CLS:IFF$="F"THEN2370
2360  GOTO2430
2370  CLS:PRINT
2380  PRINT"You attack the..";MS$:GOSUB70
2390  PRINT"With a swing of your sword"
2400  N=FNR(5)+1+(FNR(CA)/2+1):HM=HM-N
2410  IFHM<=0THEN2610
2420  PRINT"You do";N;" points of damage"
:PRINT:GOTO2310
2430  W=FNR(4)+1:C=C1:D=D1
2440  PRINT"You quickly run out..":IFTL=1
THEN3040
2450  N=FNR(9)+1:BB=2:GOSUB80:IFW>=3THEN2
910
2460  H1=H1-N
2470  PRINT"as you leave the",,MS$;"  atta
cks"
2480  IFH1<=0THENRETURN
2490  PRINT"& it does";N;" points of dama
ge"
2500  BB=3:GOSUB80:RETURN
2510  PRINT:W=FNR(7)+1
2520  PRINT"....it attacks you":IFW<=2THE
N2920
2530  W=FNR(6)+1:IFW>=3THEN2560
2540  N=(FNR(HP)/L1)*2
2550  GOTO2570
2560  N=FNR(HP)*PL+1
2570  N=N+1:IFHM<=2THENN=1
2580  H1=H1-N:GOSUB70:IFH1<=0THENRETURN
```

```
2590 PRINT"% it does";N;" points of dama
ge"
2600 PRINT"You have..";H1;" hp left":PRI
NT:RETURN
2610 PRINT:GOSUB70:PRINT"You kill the ";
MS$:PRINT
2620 IFA(C,D,L1)>=6THEN2650
2630 IFA(C,D,L1)=2THEN2650
2640 A(C,D,L1)=1
2650 G8=500:IFA(C,D,L1)>=6THENG8=250
2660 G4=FNR(G8/L1)+76:IFA=2THENG4=G4*2
2670 G=G+G4:GOSUB70
2680 PRINT"You search the area and find"
:GOSUB70:PRINTG4;" gold coins"
2690 CA=CA+1:IFK=1THENRETURN
2700 IFL1=1THEN1450
2710 IFCA=K4THEN1410
2720 RETURN
2730 GOSUB70:GOSUB70:GOSUB2880
2740 PRINT"I am the Wind Wizard":PRINT"I
 will not harm you...":GOSUB70
2750 PRINT:G4=FNR(300)+101:G=G+G4:PRINT
2760 PRINT"I give you..";G4;" gold coins
"
2780 H4=FNR(1)*10/PL+1+(6/PL):H1=H1+H4
2790 PRINT"I will heal your wounds also"
:PRINT"Your hp are now";H1
2800 GOSUB70:RETURN
2810 GOSUB2880
2820 MS$="Doom Spider":HP=9:HM=20
2830 PRINT"It's a huge man-sized crawlin
g":PRINT"....Spider of Doom..":GOSUB70:P
RINT"...and..":GOTO2310
2840 GOSUB2880
2850 MS$="Wretch":HP=12:HM=39:CLS
2860 PRINT"Do not pass sucker,for I am",
,"Wretched Rhonda"
2870 BB=2:GOSUB80:GOTO2310
2880 CLS:PRINT"Suddenly...something jump
s..":PRINT"In front of you..."
2890 BB=3:GOSUB80:CLS
2900 RETURN
2910 GOSUB70:PRINT"as you leave...":PRIN
T"The ";MS$;" strikes..":GOSUB70
2920 GOSUB70:PRINT"But misses":BB=2:GOSU
B80
2930 RETURN
2940 BB=2:GOSUB80:GOSUB1650:DY=1:H1=HI
2950 PRINTA$:PRINT"You have entered a zo
ne":PRINT"betwixt Life and Death":PRINT:
BB=3:GOSUB80:PRINT:PRINT"I...The Wind Wi
zard":PRINT"Will restore your life":PRIN
T"and you have one more chance."
2960 PRINT:MD=(FNR(15)+1)*CA+10:H1=HI
2970 PRINT"You shall have but";MD;" move
s":PRINT"to exit this dungeon":BB=9:GOSU
B80
2980 GOSUB1650:GOTO400
2990 PRINTA$;" you have no more time":GO
TO810
3000 PRINT"Enter level of difficulty"
3010 INPUT"1-hard 2-really hard ";PL
3020 IFPL<>1ANDPL<>2THEN3010
3030 PRINT:RETURN
3040 TL=0:BB=2:GOSUB80
3050 PRINT"You activated the teleport tr
ap":BB=2:GOSUB80:GOSUB1650
3060 PRINT"You end up back in the area w
here":PRINT"..You last teleported from!"
:GOSUB70:RETURN
3070 CLS:PRINT"You fall into a deep,dark
```

```
":PRINT"pool of murky water":BB=4:GOSUB8
0
3080 W=FNR(6)+1:IFW>=5THEN3110
3090 IFW>=3THEN3140
3100 PRINT"It is warm & soothing":GOSUB7
0:RETURN
3110 MS$="Kraken":HP=8:HM=23:CLS
3120 PRINT"Suddenly you feel something w
arm":PRINT"rub against your legs":BB=4:G
OSUB80:PRINT"& you see that it is a slim
y":PRINT"..";MS$;"..-ready to attack":GOS
UB70
3130 PRINT:PRINT"As you climb out..":GOS
UB70:GOTO2310
3140 PRINT:PRINT"The water is steaming h
ot":GOSUB70:PRINT:PRINT"As you jump out,
you loose"
3150 G4=FNR(500)+101:IFG-G4<0THENG4=G
3160 G=G-G4:PRINTG4;" gold coins":PRINT"
Which fall into the pool....lost":BB=5:G
OSUB80:RETURN
```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Addendum

This must be the most read part of any magazine . . . which is a little unfortunate really . . . But never mind . . . to err is human to forgive a computer programmer is divine!

Here's the booboos . . .

Firstly, on page 20 in the previous mag, line 10 should read.

10 DATA 0,0,0,ED,5B,0,FO,CD,51,4A,FE,0,C-O,ED,5B,0,FO,1C,AF,BB,20,A,14,3E,CO,BA,20,4,32,2,FO,C9,ED,53,0,FO,C3,3,FO

For those who have a SF-7000 disc unit alter line 10 to . . .

10 DATA 0,0,0,ED,5B,0,FO,CD,14,1,FE,0,CO,ED,5B,0,FO,1C,AF,BB,2O,A,14,3E,CO,BA,20,4,32,2,FO,C9,ED,53,0,FO,C3,3,FO

Next error . . . page 29 in the previous mag. A lot of people were having trouble with Delta Race . . . they seemed to crash for no apparent reason. All you need to do is place the following in . . .

530 TIME$ = "00:00:00"

The next blunder was made in the Black Jack program, line 9170 on page 25 should read . . .

9170 COLOUR1,3:CLS:GOSUB 9500

REVIEWS

ONE DAY CRICKET

Now for all you budding Richard Hadlees' and Jeremy Coneys' out there here is a game to wet your appetite. Grab the family, neighbours grandma and all, and get a team together. For 2 to 22 players this is a cricket bonanza.

The game has the New Zealand and Australian teams built in but you can input your own teams. To begin you set your field and your away. An excellent game for learning the rules of cricket as it has practically every rule as well as comprehensive instructions. Your chance to bowl like Richard Hadlee or bat like Lance Cairns. Good practice for the oncoming cricket season. This has to be the best sports stimulation but must take the cake for being the best 22 players game on the market! All the thrills and spills of International Cricket. Animation and graphics are superb. You have to see it to believe it!

OH NO!! The family is calling me to the crease. I'm facing Denise Lilly (GULP)!

FROGGY By David Harvey

From the maker of DUNGEONS BENEATH CAIRO and CUBERT comes FROGGY.

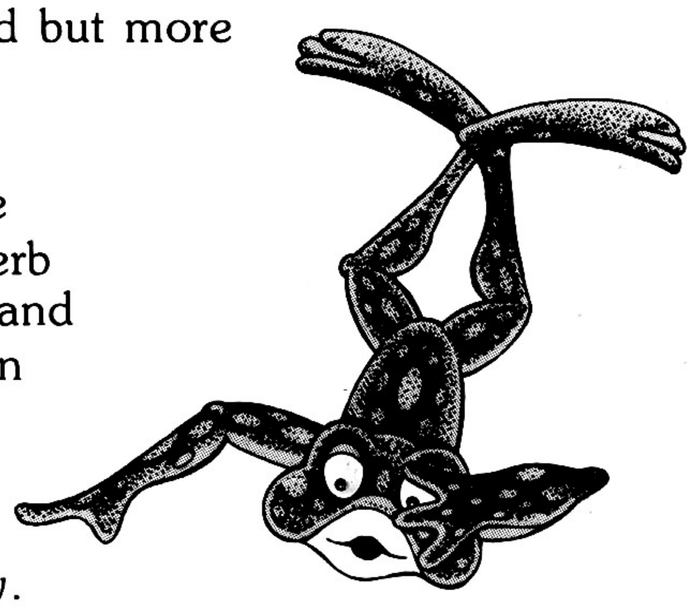
If you are a frogger fanatic or just looking for a good game, you'll leap for joy over FROGGY. This is an excellent version of your arcade favourite which in many ways rivals the original. Froggy features two fast action screens and a Hall of Fame high score table. The first screen sees poor Froggy trying to cross an extremely busy road. If that is not daunting enough there is also a deadly cobra to worry about!

The second screen sees Froggy leaping logs, turtles and lillys as well as speedboats. To top this off Froggy has to worry about the nasty crocodile!

Do not stop for flies or Froggy will croak for sure. Froggy has to travel through both screens to fill one of the frog houses (twice as hard but more importantly twice as much fun!).

Fast exciting machine code game with superb animation, garphics and sound. Double screen action thats double the fun.

Fun for all the family.



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New Zealand

HARDWARE REVIEW

A Power controller is now available for your Sega SC-3000. Up till now, power controllers have only been available for larger machines and costing well over $400.00, but at last somebody has come up with one at a decent price.

The unit comes nicely packaged, with everything you need to start including power supply, full instructions, example of wiring applications, LED indicators built into the facia to tell the user which controller is in use, audio in, audio out facilities and finally the expansion socket.

The unit will cost $220.00 and will only be available from the address below.

This power controller will enable you to connect up to four different appliances at once, the unit itself puts out a voltage of 5 volts thus 5 volts could be used for turning on relays, opto coupler and inputs of logic gates. (relays not included due to different voltages for different applications). The controller takes full advantage of the Sega's BASIC sound commands and plugs directly into the Video port at the back of the computer. The unit can be used with or without the SF-7000 Disc Drive connected. Turning on a device by the power controller is only a matter of sending data out from the computer through the sound port, a tone of approximately two seconds. The tone is a particular frequency in the range of 500 Hz to 5KHz. Each tone represents one of the four controlled outputs. To turn again. The maximum No of devices which one unit can control is four, however, by using the Power controller expansion unit in conjunction with the power controller, the user can control a total of ten appliances.

Power controllers open up the outside world to your computer with applications ranging from controlling simple robots, lighting effects, controlling electrical appliances such as television etc for a home burglar alarm system (using the Sega's inbuilt time function you can make a would be thief think there is someone still at home) etc, etc.

A product that you can use in conjunction with the power controller is an opto switch, which allows the user to turn off 230 volt ac appliances. As the name implies, a light source that is incased in a ceramic package turns on an electronic switch which turns the appliance on or off accordingly. Because an electronic switch does the switching there is no relay contact arcing and points bounce. The reason a light source is used in this type of switch is purely for safety. If a fault develops with the opto switch, or the appliance, 230 volts is not passed down through the interfacing cable to the computer outputs or any other controlling device. There is no electrical connection between the electronic switch and the controlling device, only between the light source and the controller. Both the opto coupler and triac are incased in ceramic packages. The electrical break-down voltage of this package is several thousands of volts.

There are many uses for the opto-switch open to the user, direct control is possible for various 230 volt appliances, provided the load is not greater than 100 watts.

These units will not be available in Retail shops so if you want information regarding specifications and full price list etc, write to the address below.

User Tronics Developments LTD
P.O. Box 29124
Greenwoods corner
Epsom
Auckland 3

The power controller connected to the Sega Sc-3000

There is also a Speech Synthesiser available for the Sega SC-3000 & SF-7000. The speech processor is based on an "allophonic" system which allows the user to select individual speech sounds and string these together to fabricate words. The processor has a allophonic set, which is an inventory of sixty four English sounds. This type of system provides an unlimited vocabularly, since the stored units correspond to sounds not words. The emphasis in this approach shifts to the programmer, to select the appropriate sounds to represent the word.

The unit simply plugs into the centronics printer port of the SF-7000, although speech processor uses TRI-STATE inputs, so that the processor and printer may be connected in parallel and the one that is not used may be switched to standby mode.

Sending data out to the Speech synthesiser is only a matter of addressing the printer port, ie LPRINT CHR$ (a); command, as used in micro soft basic. Where "a" is the decimal value of the allophonic set.

The unit has a standby switch which enables you to use the printer or speech synthesiser off the same printer port.

As well as a speaker socket which enables you to listen to your speech through a set of headphones or external speakers. Or alternatively you can use the AMP socket to run the unit through your hi fi system!!

A program which converts words to allophonic sets comes supplied with the unit as well as a sample program.

Please note: This unit works off the centronics printer port on the Sega SF-7000, so unless you have this disc drive or the centronics parallel interface you cannot use this product. (alternatavely, you could buy a parallel centronics interface which plugs into the Sega printer port and then the speech synthesiser will work

USER TRONICS DEVELOPMENTS
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AUCKLAND 3

Speech synthesiser is connected to a Sega SC-3000 plus SF-7000.

Scheduler

GRANDSTAND

This program is for use in workstudy/production control Being implemented on a micro, it should be applicable to the practically minded manager who would normally be intimidated by trying to get to grips with a large company computer terminal.

The program will provide an efficient method for determining a sequence for processing a set of jobs, or maybe a customer, either of which will place demands on organisational resources. Under certain conditions the problem will be solved, or at least an optimum solution will be found.

The specific application may not be exactly tuned to your requirements, but you may well be able to tailor the format to suit a wide variety of planning applications in commercial (and private) situations.

Sequencing

Sequencing is the order in which jobs are placed for processing. Sequencing jobs involves the ordering of jobs through one or more processes, so that specific performances, (optimum performances), such as minimal idle time, total machine time, and time delivery dates are reached, variations of which can produce significant results in costs and productivity.

The sequential ordering of the start and finish of jobs is called a schedule. This schedule is only formed when the processing sequence has been established, noting that a job does not start until the previous job has finished. The machines provide the process by which the jobs are completed, and machines need not be mechanical, they could be human, (visual quality check, and so on). It is also important to note that all jobs must go through the same process.

The process time is the amount of time that a machine will need to complete that process, the times for these processes are then collected. These times are then manipulated to obtain the configuration requiring the least amount of processing time: maximum efficiency. Assuming that the least amount of processing time is the result required!

Total facility processing time is the total machine time plus the machine idle time. Therefore reducing the total facility processing time also reduces the machine idle time.

The method used to solve this problem was developed by S.A. Johnson and later extended by W.A. Stark, (number of jobs — 1 method). These two algorithms are used in the program to obtain the results.

The Johnson algorithm finds the shortest processing time for two machines, the Stark algorithm is then used to get the shortest processing time from the total number of jobs. By using the Johnson algorithm on the first two times and the last two times, another sequence is obtained. Stark's algorithm is repeatedly applied to the Johnson algorithm, (1 to number jobs-1).

This procedure will develop several sequences, allowing some discretion as to the best sequence for one's purposes, considering that holidays and maintenance must be accounted for.

The program itself

The program will ask for the number of jobs you have to process, say 4 cars for service at a garage — or four items for assembly into a final product.

Then the program asks for the number of operations: the example garage operations are: service, oil change, wash/clean, polish [Really? You must let me have the name of your garage:ed]

The assembly operations are:

Assemble and cable into roverpoint, seal roverpoint, attach plug and test. Next enter a brief description of the operations, service, oil change, wash/clean and polish. Now enter the job name: for the garage it might be a CORTINA.

Then enter the times the cortina has to spend in each operation.

The computer then asks for the units of time you are using.

The computer now presents a summary of the data input, together with the finish times. Another prompt invites you to proceed to check times for th einitial sequence.

Next comes the schedule itself, and you can list all the options, or select only the best ones.

Having decided how you want to view the results, the program goes through its paces to list the best results for you to examine, and then finally to determine the recommended schedule, sequence and the time involved.

```
10  CLS
20  COLOR  15, 1
30  PRINT: PRINT: PRINT
```

```
40  INPUT"HOW MANY JOBS (10 OR 15)";QW
100  CLS:COLOR 15,1
110  DIM M(QW,QW),J$(QW),M$(QW),A(QW)
120  DIM B(QW),C(QW),SE(QW,QW),PS(QW)
130  DIM MT(QW),T1(QW,QW),T2(QW,QW)
140  DIM IT(QW),KL(QW)
150  GOTO 410
160  REM
170  T1(1,1)=0
180  FORI=1TONM
190  T2(1,I)=T1(1,I)+M(C(1),I)
200  IFI=NMTHEN220
210  T1(1,I+1)=T2(1,I)
220  NEXTI
230  TI=T2(1,1)
240  FORJ=2TONJ
250  T1(J,1)=T2(J-1,1)
260  T2(J,1)=T1(J,1)+M(C(J),1)
270  NEXTJ
280  REM
290  FORJ=2TONJ
300  FORI=2TONM
310  T1(J,I)=T2(J,I-1)
320  IFT2(J-1,I)>T2(J,I-1)THENT1(J,I)=T2(
J-1,I)
330  T2(J,I)=T1(J,I)+M(C(J),I)
340  NEXT  I,J
350  REM
360  RETURN
370  CLS:COLOR  14,4:PRINT:PRINT:PRINT
380  REM
390  REM
400  REM
410  PRINTSPC(10);"MACHINE  SCHEDULING"
420  PRINT
430  PRINTSPC(12);"BY  GRANDSTAND."
440  PRINT:PRINT:PRINT"PROGRAM CAN BE USE
D FOR UP TO 20"
450  PRINT"JOBS AND 20 MACHINE OPERATIONS
.":PRINT
460  PRINT:PRINT,"NOTE:"
470  REM
480  PRINT,"_______"
490  PRINT,"COMPLETE ALL DATA"
500  PRINT,"ENTRIES BY HITTING"
510  PRINT,"THE RETURN KEY"
520  REM
530  REM
540  GOSUB  110
550  REM
560  DY=0
570  PRINT:INPUT"TYPE IN THE NUMBER OF JO
BS";NJ
580  PRINT
590  INPUT"HOW MANY MACHINE OFERATIONS ";
NM
600  CLS
610  PRINT"BEGIN BY DESCRIBING THE MACHIN
E          OFERATIONS."
620  PRINT"THESE OFERATIONS ARE ASSUMED T
O BE       SEQUENTIAL."
630  PRINT
640  FORI=1TONM
650  PRINT:PRINT
660  PRINT"DISCRIPTION OF MACHINE OFERATI
ON No ";I
670  PRINT"(USE UP TO 7 CHARACTER)."
680  INPUTM$(I)
690  IFLEN(M$(I))<=7THEN730
700  PRINT
```

```
710  PRINT"USE ONLY SEVEN CHARACTERS PLEA
SE"
720  PRINT:GOTO660
730  NEXTI
740  CLS
750  PRINT"NOW BREIFLY, (6 CHARACTERS OR L
ESS)      DESCRIBE EACH JOB,AND THE TIME I
N EACHMACHINE OFERATION FOR THAT JOB."
760  PRINT
770  FORJ=1TONJ
780  PRINT"TYPE A DISCRIPTION OF JOB ";J
790   INFUTJ$(J)
800  PRINT
810  PRINT"FOR THIS JOB,ENTER THE TIME (T
O THE     NEAREST TENTH UNIT) REQUIRED FOR
  EACH OF THE MACHINE OFERATIONS LISTED
     BELOW."
820  PRINT
830  PRINT"USE THE SAME TIME UNITS FOR AL
L          OPERATIONS."
840  PRINT
850  FORI=1TONM
860  PRINT"TIME IN OPERATION ";M$(I);"  =";
870   INPUTM(J, I)
880  PRINT
890  NEXTI
900  CLS
910  NEXTJ
920  REM
930  PRINT"INPUT COMPLETE"
940  PRINT
950  PRINT"TYPE IN THE UNITS OF TIME,
          (E.G, MINUTES, HOURS, ETC.)"
960   INPUT UNIT$
970  NS=1
980  NF=NS+3
990   IFNF>NMTHENNF=NM
1000   CLS
1010   IFNS=1THENGOTO1040
1020   PRINT,,"MACHINE OPERATIONS (CONT."
1030   GOTO1050
1040   PRINTSPC(10);"MACHINE OPERATIONS"
1050   REM
1060   PRINTSPC(11);"(TIMES IN ";UNITS$;")"
1070   PRINT:  PRINTSPC(17);"JOB";PRINTSPC(
17);"999";,,
1080   FORI=NSTONF
1090   PRINTM$(I),,
1100   NEXTI
1110   PRINT
1120   FORJ=1TONJ
1130   PRINTJ;".";,,J$(J),,
1140   FORI=NSTONF
1150   PRINTM(J, I),,
1160   NEXTI
1170   PRINT
1180   NEXTJ
1190   PRINT:PRINT"DO YOU WISH TO CHANGE A
NY OF THE DATA"
1200   A$=INKEY$: IFA$=""THEN1200
1210   IFA$="Y"THENGOSUB2720:GOTO1000
1220   IFA$<>"N"THEN1200
1230   PRINT"DO YOU WISH TO RE-ARRANGE YOU
R SCHEDULE."
1240   FORB=1TO100:NEXT
1250   B$=INKEY$: IFB$=""THEN1250
1260   IFB$="Y"THENGOSUB3830:GOTO970
1270   IFB$<>"N"THEN1250
1280   IFNF=NMTHEN1300
1290   NS=NF+1:GOTO980
```

```
1300  FORJ=1TONJ:C(J)=J:NEXTJ
1310  GOSUB2980
1320  GOSUB160
1330  CLS
1340  PRINT:PRINT"INITIAL  SEQUENCE"
1350  PRINT:PRINT"ORDER                                    JOB
NAME                    F/TIME"
1360  PRINT
1370  FORJ=1TONJ
1380  PRINTJ;,;J$(J);,;T2(J,NM)
1390  NEXTJ
1400  GOSUB110
1410  KK=0
1420  GOSUB3080
1430  LETBT=NM*T2(NJ,NM)
1440  DY=0
1450  FG=1
1460  GOSUB3390
1470  GOSUB110
1480   IFNM=2THENGOTO1570
1490  PRINT"TO VEIW ALL LOADING SEQUENCES
  AS THEY ARE DETERMINED."
1500  PRINT"TYPE AN <A>, TO VEIW ONLY THE
  BEST SCHEDULE(S)."
1510  PRINT"TYPE A <B>."
1520  PRINT"YOU MAY RETURN LATER TO REVIE
W ALL SCHEDULES."
1530  PRINT:PRINT"A OR B"
1540  A$=INKEY$: IFA$=""THEN1540
1550   IFA$="B"THENDY=1:GOTO1570
1560   IFA$<>"A"THENGOTO1540
1570  FORKK=1TONM-1
1580  RPT=0
1590  GOSUB1920
1600  GOSUB2040
1610   IFRPT<>1  THENGOSUB  2550
1620  GOSUB160
1630   IF  FG=0THEN1670
1640   IFNM<>2THEN1650
1650  GOSUB2410
1660  GOSUB3080
1670  GOSUB3390
1680   IFFG=0THEN1710
1690  GOSUB110
1700   IFRPT=1THENGOTO1840
1710  NEXTKK
1720   IFNM=2THEN1840
1730  GOSUB3640
1740  FORLL=0TOLM
1750  KK=KL(LL)
1760  DY=0
1770  CLS
1780  PRINT"A  GOOD  JOB  SEQUENCE  IS:"
1790  PRINT
1800  PRINT"ORDER                JOB  NAME     F/TIME"
1810   IFNM=2THENRETURN
1820  LETRPT=1:GOTO1590
1830  NEXTLL
1840  GOSUB2830
1850  ONFGGOTO1880,1900
1860  PRINT:PRINT"THEN  GOODBYE!":PRINT
1870  GOTO1910
1880  FG=0:CLS
1890  GOTO970
1900  GOTO560
1910  END
1920  REM**COMBINE  DATA
1930  FORJ=1TONJ
1940  A(J)=0:B(J)=0
1950  NEXTJ
1960  FORI=1TOKK
```

```
1970  FORJ=1TONJ
1980  A(J)=A(J)+M(J,I)
1990  B(J)=B(J)+M(J,NM-I+1)
2000  NEXTJ
2010  NEXTI
2020  RETURN
2030  REM
2040  NF=0:NL=NJ:L=0
2050  GOSUB 2330
2060  FORJ=1TONJ
2070  C(J)=NJ+1
2080  NEXTJ
2090  SM=TT
2100  FORJ=1TONJ
2110  FL=0
2120  REM
2130  FORJJ=1TONJ
2140  IFJ=C(JJ)THENFL=1
2150  NEXTJJ
2160  IFFL=1THENGOTO2190
2170  IFB(J)<=SMTHENSM=B(J):IL=J:L=2
2180  IFA(J)<=SMTHENSM=A(J):IL=J:L=0
2190  NEXTJ
2200  IFL=2THENGOTO2230
2210  C(NF)=IL
2220  NF=NF+1:GOTO2250
2230  C(NL)=IL
2240  NL=NL-1
2250  IFNL>=NFTHEN2090
2260  REM
2270  REM
2280  FORJ=1TONJ
2290  SE(KK,J)=C(J)
2300  NEXTJ
2310  RETURN
2320  REM
2330  TT=A(1)
2340  FORJ=1TONJ
2350  P=TT:IFP<A(J)THENP=A(J)
2360  TT=P
2370  Z=TT:IFZ<B(J)THENZ=B(J)
2380  TT=Z
2390  NEXTJ
2400  RETURN
2410  REM
2420  IFRFT=1THENGOTO2490
2430  CLS
2440  IFNM<>2THENGOTO2460
2450  PRINT"AN  OPTIMAL  SEQUENCE  IS:":GOTO
2470
2460  PRINT"A  POSSIBLE  SEQUENCE  IS:"
2470  PRINT
2480  PRINT"ORDER          NAME          F/TIME"
2490  FORJ=1TONJ
2500  PRINTJ," ",J$(C(J))," ",T2(J,NM)
2510  NEXTJ
2520  GOSUB210
2530  RETURN
2540  REM
2550  FG=1
2560  IFNM=2THENRETURN
2570  IFKK<2THENRETURN
2580  FORK=1TOKK-1
2590  IFNG=0THENGOTO2660
2600  NF=0
2610  FORJ=1TONJ
2620  IFNF=1THENGOTO2640
2630  IFC(J)<>SE(K,J)THENNF=1
2640  NEXTJ
2650  IFNF=0THENLETFG=0
2660  NEXTK
```

```
2670  REM
2680  REM
2690  REM
2700  RETURN
2710  REM
2720  PRINT: INPUT"ENTER THE JOB NUMBER   "
;J
2730  IFJ<1ORJ>NJTHENPRINT"ERROR-RE-ENTER
  PLEASE": GOTO2720
2740  PRINT: PRINT"NOW ENTER THE NEW JOB D
ESCRIPTION"
2750  INPUTW$
2760  IFLEN(W$)>7THENW$=LEFT$(W$,7)
2770  J$(J)=W$
2780  FORI=1TONM
2790  PRINT"ENTER THE NEW TIMES FOR OPERA
TION  "; M$(I);
2800  INPUTM(J,I)
2810  NEXTI
2820  RETURN
2830  LETFG=0
2840  PRINT
2850  PRINT"DO  YOU  WISH  TO  SCHEDULE  MORE?"
2860  PRINT: PRINT"Y  OR  N"
2870  INPUTAN$
2880  IFAN$=""N"THEN  RETURN
2890  IFAN$<>"Y"THENGOTO2870
2900  PRINT: PRINT"DO  YOU  WISH  TO  MODIFY  E
XISTING  DATA  ?"
2910  PRINT"Y  OR  N"
2920  INPUTAN$
2930  IFAN$=""Y"THENLETFG=1: RETURN
2940  IFAN$<>"N"THENGOTO2920
2950  PRINT"THEN  A  NEW  PROBLEM  IS  ASSUMED"
2960  FG=2
2970  RETURN
2980  REM
2990  FORI=1TONM+1: MT(I)=0: NEXTI
3000  FORI=1TONM
3010  FORJ=1TONJ
3020  MT(I)=MT(I)+M(J,I)
3030  NEXTJ
3040  MT(NM+1)=MT(NM+1)+MT(I)
3050  NEXTI
3060  RETURN
3070  REM
3080  IFDY=1THENRETURN
3090  NS=1
3100  PRINT"JOB",,
3110  IFNS=1THENGOTO3140
3120  PRINT"SCHEDULING  (CONT.)"
3130  GOTO  3150
3140  CLS
3150  PRINT"  SCHEDULE"
3160  PRINT"_____"
3170  NF=NS+3
3180  IFNF>NMTHENNF=NM
3190  FORI=NSTONF
3200  PRINT, "      "; MS(I); "      ";
3210  NEXTI
3220  PRINT
3230  FORI=NSTONF
3240  PRINT, "  IN      OUT  ";
3250  NEXTI
3260  PRINT
3270  FORJ=1TONJ
3280  PRINTC(J);"  ";"  ";"  ";
3290  FORI=NSTONF
3300  PRINT, INT(T1(J,I)); "      "; INT(T2(
J,I));
```

```
3310  NEXT I
3320  PRINT
3330  NEXT J
3340   IF NF=NM THEN GOTO 3360
3350  NS=NF+1 : GOTO 3100
3360  GOSUB 110
3370  RETURN
3380  REM
3390  OT=NM*T2(NJ, NM)
3400   IF OT>BT THEN BT=OT
3410   IT(KK)=INT(OT)-INT(MT(NM+1))
3420   IF FG=0 THEN RETURN
3430  CLS
3440  PRINT"     PERFORMANCE  CHARACTERISTICS
                FOR:";
3450   IF KK<>0 THEN GOTO 3480
3460   PRINT"  INITIAL  SEQUENCE"
3470  GOTO 3520
3480   IF NM<>2 THEN GOTO 3510
3490  PRINT"OPTIMAL  SEQUENCE"
3500  GOTO 3520
3510  PRINT"THIS  SEQUENCE"
3520  PRINT"-------------------------------------------
-------------"
3530  PRINT"TOTAL  FACILITY  PROCESSING  TIM
E";
3540  PRINT"=";INT(OT+.5);", IN UNITS OF  "
;UNIT$
3550  PRINT
3560  PRINT"TOTAL  MACHINE  PROCESSING  TIME
";
3570  PRINT"=";INT(MT(NM+1)+.5);", IN     UN
ITS  OF  ";UNIT$
3580  PRINT
3590  PRINT"IDLE  MACHINE  TIME";
3600  PRINT"=";INT(IT(KK)+.5);", IN  UNITS
OF       ";UNIT$
3610  PRINT
3620  RETURN
3630  REM
3640  FOR I=0 TO NM-1
3650  T=BT: IF BT<IT(I) THEN T=IT(I)
3660  BT=T
3670  NEXT I
3680   IS=-1
3690  KK=0
3700   IF IT(KK)=BT THEN IS=KK
3710   IF KK>=(NM-1) THEN GOTO 3730
3720  KK=KK+1 : GOTO 3700
3730  KL(0)=IS
3740  L=1
3750  FOR I=0 TO IS-1
3760   IF IT(I)<>BT THEN GOTO 3790
3770  KL(L)=N
3780  L=L+1
3790  NEXT I
3800  LM=L-1
3810  RETURN
3820  REM
3830  PRINT:PRINT"ENTER THE MACHINE NUMBE
R  YOU  WISH  TO    MOVE."
3840  PRINT"THEN  ENTER  THE  NEW  LOCATION  I
N  YOUR      SCHEDULE  (X,Y)"
3850   INPUT  FS, MS
3860  PA$=M$(FS) : M$(FS)=M$(MS) : M$(MS)=PA$
3870  FOR I=1 TO NJ
3880  PS(I)=M(I, FS)
3890  M(I, FS)=M(I, MS)
3900  M(I, MS)=PS(I)
3910  NEXT I
3920  RETURN
```

USING RS 232

This article is for all the Sega owners out there who have a SF-7000 Disc Drive.

One of the features of the SF 7000 is the RS232 interface. In this article I will try to explain the applications this little beastie can be used for.

With a RS232 interface fitted you have the means to communicate with printers, modems, and other computers.

The use of a RS232 interface allows you to connect equipment together using very simple wires up to 50 ft long. It is possible, using a modem, to convert the signals in these wires into a form in which they can be sent almost any distance to another modem, over the standard telephone system.

Please refer to pages 200 and 201 of your SF 7000 Disc Drive Manual for the wiring of two computers together.

USING THE RS232 WITH A PRINTER

It is possible to alter the speed at which characters are transmitted from the RS232 to the printer. The speed is measured by a figure known as the "BAUD RATE". The baud rate is measured in "bits per second". 8 bits make a byte so take the Sega data recorder for example, this transferrs data at 1200 baud 1200/8 = 150 characters per second

You need to make sure that the RS232 is transmitting at the same speed as the printer is receiving. Do not confuse this interface speed at which the printer actually prints characters on paper. If the printer cannot keep up with the rate at which characters are arriving from the RS232 then it will send special signals back to the RS232 instructing it to stop sending, until the printer catches up. This process is known as "flow control".

If you are using a RS232 printer (as you probably are if you are reading this!) you will find switches (possibly inside the casing) to set the baud rate, please refer to the printer manual to set these D.I.P switches.

The best speed to choose is proably 1200 baud (150 characters per second). So, set the DIP switch on the printer to 1200 baud, then refer to page 200 of your SF 7000 manual to set the "jumper" to pin 4. (1200 baud)

Using the "ESC-TAB.BAS" program supplied with your SYSTEM DISC as well as reading pages 215-218 of the SF-7000 manual you can now set margins, line space setting etc.

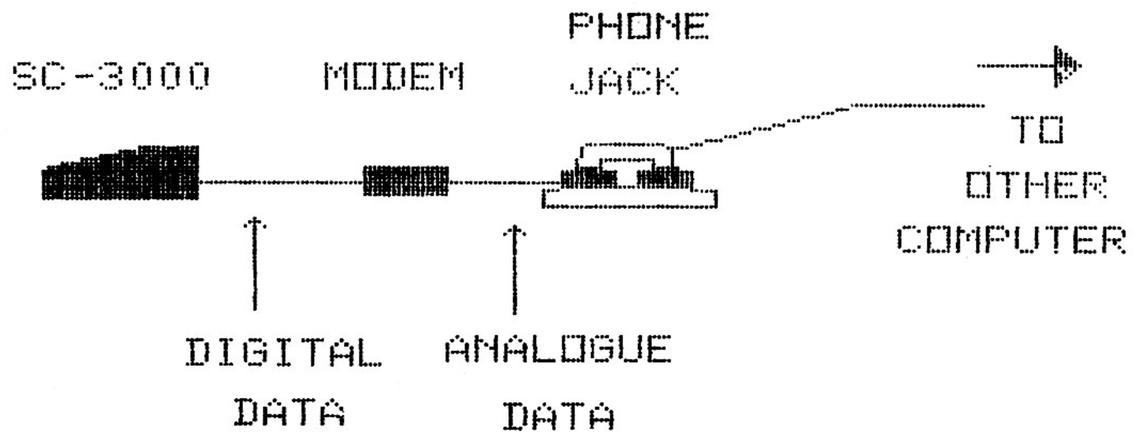
Simply re-boot the computer with system disc supplied to return to normal printer port.

CONNECTING TO ANOTHER COMPUTER VIA A MODEM

A modem is simply a way of extending the distance between two computers (as opposed to cable) — normally via the standard telephone network.

(Modem is short for Modulator/demodulator)

A modem will take your computer's digital signals and change them into analogue singals to go over the telephone lines. When data is sent back, a modem will convert them back from analogue signals to digital signals so that your computer can understand them.

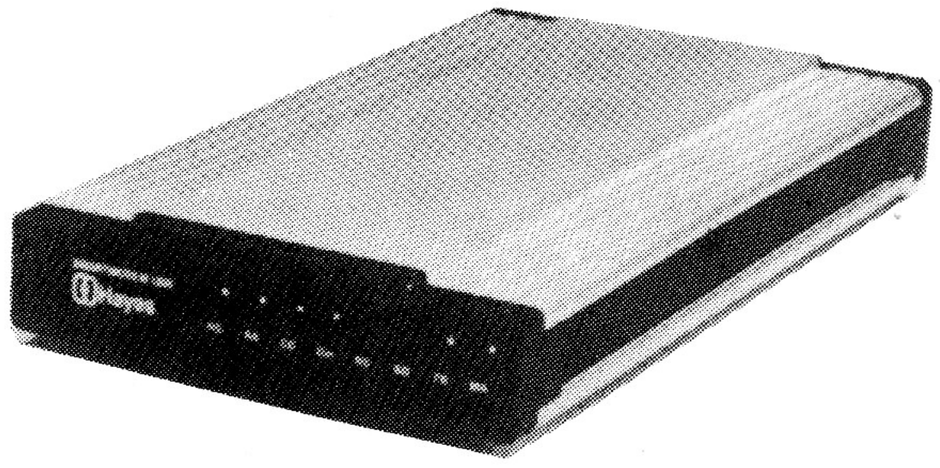


There are two types of modems available, one being a "DIRECT LINE" and the other being an "ACOUSTIC TYPE".

Direct line modems are the more reliable of the two, but they are pretty rare at the moment due to restrictions set by the post office.

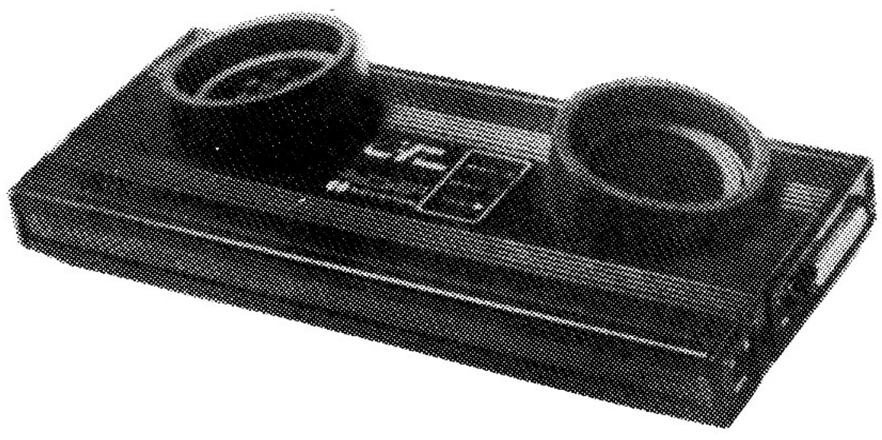
The Post Office has to analyse each make and model of modems which are brought onto the market by examining how it was built etc, this can take up to six months to assess. Once the modem has been Post Office approved then it can be put out into the shops.

Direct line modems also require a Post Office teleophone technician to install a telephone output jack onto your telephone.



A direct line modem with all the mod cons. (note the facia L.E.D.s to tell the operator what is happening.

Accoustic modems simply connect to your telephone hand piece via rubber cups. Unfortuantely this type has certain drawbacks. It is prone to pick up room noise which can garble the received message, and the microphone in the handset itself is a source of noise at times (usually the most crucial time!!)



An example of an accoustic modem. Note the rubber cups where the telephone handpeice fits.

MODEM CONSIDERATIONS AND FEATURES

Full-Duplex modems	Will allow you to receive and send data at the same time it also 'echoes back' what you type at your keyboard, this means you can see on your screen exactly what the receiving computer sees (an error checking device.)
Half-Duplex modems	Allow only one signal at a time to come either from or to your computers.
Originate/Answer	This feature will let the operator send and receive calls.
Originate only	These feature will let the operator send and receive calls.
Auto dial	The ability to let the computer dial a computer number automatically from the keyboard.
Auto answer	The ability to let the computer answer calls and receive information while the operator is away.
Auto disconect	Allows the computer to automatically 'hang up' the telephone line after a transmission has been terminated so as the line is free for more calls.
Intelligent modems	These can do a number of additional chores. For example, say you want to connect to an information service and either the telecommunications link or the ports o the service are all busy. The 'smart' modem will continue to dial until a connection has been made.

There are various modems on the market at the moment which will interface with the Sega Disc Drive unit because it has a RS-232. You can hire one from the Post Office, or you can buy one.

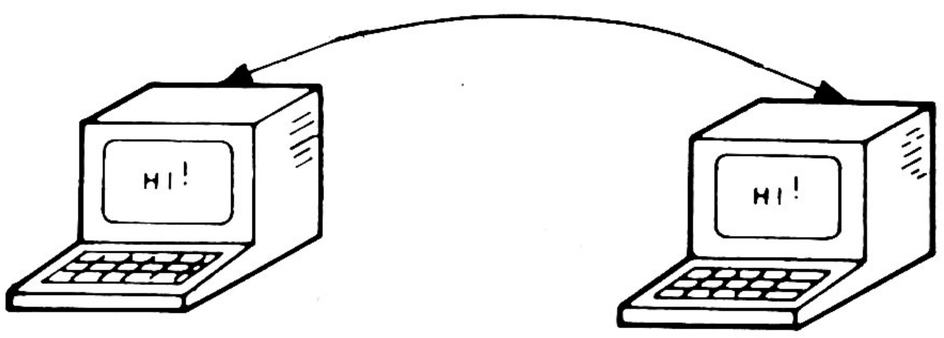
One modem in particular that is expecially suited to the Sega with disc drive is the VMD312 which is available from ASMAIL & ASNET for $399.00. This modem comes complete with RS232 interface, Asynchronous operation, built in telephone jack, multiple speed selection, full duplex, Post Office approval for direct line, and several visual display status indicators. If you have any Queries regarding this modem write to:

ASMAIL AND ASNETT
P.O. BOX 39159
AUCKLAND

Once you have a modem attached to your computer you can access databases, stock exchange rates, send a program to a friend in another country, etc etc, in fact the uses for a modem are just about limitless.

CONNECTING TWO COMPUTERS FOR FILES TRANSFER AND COMMUNICATION

It is often convenient to transfer files (data) between different computers via a RS232, particularly when there is no common disc or tape format between the two machines.



The SEGA RS232 interface will accept commands such as "COMLOAD"; "COMSAVE"; "COMSET"; "INPUT# Ø,"PRINT# Ø"

Comload will accept any program sent via an RS232 and "poke" the data into the memory, but unless the "basic" keywords are the same, then the program will not run.

Comsave allows you to send a program out the RS-232 to another computer or device. (this command is pretty standard)

Comset sets up what is known as the "Transmission Protocol". The Protocol determines how much data is sent at any given time and what sort of error checking is made. Refer to page 88 of the SF-7000 handbook. After reading this section of the book you may be wondering what 'Parity' and 'Data length' are. Parity is a method of error checking. What happens is that after the transmission of one set of data the number of "1" 's in that data are added up (Note. The data is in binary) and if the number is even eg 0, 2, 4, 6 and 8 and even parity is being used then no error has occured. Otherwise if the number of "1" is odd and even parity is being used then an error has occured in the transmission of the data and will force an error accordingly.

Data length is the number of bits (binary digits) sent at one time.

Lets assume we have a program on a Spectra-video computer and we wish to transfer it into our SEGA. Type in "COMLOAD" on the Sega (to receive information), then type in the appropriate command for sending information on the Spectra-video (in the case of the Sega it would be COMSAVE). The Sega "receive" light should come on, and after a short period of time we should have the program in memory. (providing the baud rate and protocol was the same for both machines.)

We can also get the computer to show us what is being sent as it is being sent, by typing in the following program.

```
10 FOR AD = &HF000 TO &HFFFF
20 A$ = INKEY$ : IF A$ = "" THEN 40
30 IF A$ = " " THEN END
40 DA=INP(&HE9)
50 PRINT CHR$(DA) : POKE AD,DA
60 NEXT AD
```

A small description of the following program is as follows:

Line 10 sets AD from &hF000 to &hFFFF (the area of memory where the data will be stored)

Line 20 to 30 checks to see if a key was pressed. If not then carry on with the program. If the space bar is pressed the end the program.

Line 40 reads the contents of the RS-232 buffer (ASCII code) and call it DA (short for DATA)

Line 50 prints DA then pokes DA in the address AD in the R.A.M. (AD = address).

Line 60 moves onto the next address location and starts again.

PRINT#0, n (where n can a variable or a string)

This command sends data out through the RS232 either in the form of a sting (n$) or a numeric variable (n). If the data is a string then the computer changes it to ASCII. (the computer does not change 'n' because numerics are already in ASCII code.), (see program below to demonstrate this.)

A small program to show how you can utilise this command. (as it is much too hard to explain!!)

```
10 cls
20 a$=inkey$: if a$="" then 20
30 a=asc(a$)
40 print a$;"=";a,
50 print#0,a
60 if inkey$<>"" then 60
70 goto 20
```

Line 10 clears the text screen.

Line 20 checks to see if a key was pressed. If so then assigns a$ to that key.

Line 30 assigns the variable "a" to the numeric ASCII code of a$.

Line 40 PRINT a $ (the key which was pressed) then next to a$ it will print the equals sign, then the computer will print the variable "a" (which has been assigned a value in line 30. The comma splits the screens (just to tidy things up a bit!)

Line 50 PRINTS# 0, a (remember a = ASCII).

So if we press the key marked "B" then the variable "a" will be 66. Then the computer will PRINT B = 66 on the screen followed by a PRINT# 0,a.

RS-232C COMMUNICATIONS PROGRAM

This progam will allow Sega's and Disc Drive to "talk" to each other.

```
10  GOSUB  240
20  GOSUB  300
30  CONSOLE  0,24,1,1,1
40  X=19:Y=16:X1=147:Y1=16
50  A$=INKEY$:IF  A$=""  THEN  160
60  SOUND1,1000,15
70  CURSOR  X,Y:  PRINT  A$:SOUNDO
80  X=X+4:IFX>=108THEN  X=19:Y=Y+6
90  IF  Y>=170  THEN  BLINE(9,11)-(118,179),
,BF:X=19:Y=16
100  C=ASC(A$)
110  IF  C=13  THEN  X=19:Y=Y+6
120  OUT  &HE8,C
130  IF  INP(&HE9)=151  THEN  GOTO  160
140  A$=INKEY$:IF  A$<>""  THEN  140
150  GOTO  50
160  REM==PLACE  COMMENT  ON  SCREEN==
170  IF  INP(&HE9)=149  THEN  GOTO50
180  LET  A=INP(&HE8)
190  IF  A=13  THEN  X1=135:Y1=Y1+6
200  CURSOR  X1,Y1:PRINT  CHR$(A)
210  X1=X1+4:IF  X1>=236THEN  X1=147:Y1=Y1+
6
220  IF  Y1>=170  THENBLINE  (137,11)-(246,1
79),,BF:  X1=147:Y1=16
230  GOTO  50
240  SCREEN  2,2:CLS
250  LINE  (126,0)-(128,191),1,BF
260  LINE  (8,10)-(119,180),15,B
270  LINE  (136,10)-(247,180),15,B
280  COLOR  1,1
290  RETURN
300  DATA40A0E0A0A0,C0A0C0A0C0,6080808060
```

```
,C0A0A0A0C0,E0B0C0B0E0,E0B0C0B0B0,60B0A0
A060
310 DATAA0A0E0A0A0,E040404040,E040404080
,A0A0C0A0A0,B0B0B0B0E0,A0E0A0A0A0,C0A0A0
A0A0
320 DATAE0A0A0A0A0E0,E0A0E0B0B0,E0A0A0C020
,E0A0C0A0A0,60B040020C0,E040404040,A0A0A0
A0E0
330 DATAA0A0A0A0A040,A0A0A0E0A0,A0A040A0A0
,A0A0404040,E020408E0
340 DATA40A0A0A0A040,40C04040E0,C020408E0
,C020402C0,A0A0E02020,E0B0C020C0,E0B0E0
A0E0,E020404040,E0A0E0A0E0,E0A0E020C0
350 FORA=ASC("a")TOASC("z")
360 READ A$
370 PATTERN C#A,A$
380 NEXT A
390 FOR A=ASC("0") TO ASC("9")
400 READ A$
410 PATTERN C#A,A$
420 NEXT A
430 SCREEN 2,2
440 COLOR 1,14,(0,0)-(255,191),7
450 RETURN
```

DISSECTION

Line 10 Jump to the subroutine that starts at line 240. This sets up the original screen.

Line 20 Jump to the subroutine that starts at line 300. This routine sets up the little letters that are used in the display. The reason for the small lettering is to allow more text to be displayed at once.

Line 30 Set the Sega to lower case.

Line 40 Set original coordinates for where text is to be placed on the screen. X and Y hold the position of the out going texts screen posotion, whilst X1 and Y1 hold the position of the in coming texts position.

Line 50 Wait for a key to be pressed.

Line 60 Make a beep to tell the user that a letter has been accepted.

Line 70 Place that letter at the X and Y coordinates. Switch off the sound.

Line 80 make X point to the next point on the screen, ie: where the next letter is to go. If X is greater than 108 then move down a line. ie: the next letter will be off your section of the screen.

Line 90 If you have reached the bottom of the screen then wipe clean your part of the screen, and start from the top again.

Line 100 Covert the letter you just entered to a number (ASCII number).

Line 110 If you have pressed CR then move down a line.

Line 120 Output the data to the RS232 port.

Line 130 If some data is being received then go to line 160.

Line 140 Wait until you have taken your finger off the key being pressed. You may wish to remove this line.

Line 150 Go back to line 50.

Line 160 From here to line 230 is the part to handle the incoming data.

Line 170 If no data is being received then go back to line 50.

Line 180 Let A take on the value of the incoming data. Note it is a number at the moment.

Line 190 If a CR has been received then move down a line.

Line 200 Move to the location where the next letter is to be placed. Then print the information on the screen as a letter.

Line 210 Check for a letter 'falling' off the edge of the screen. If one is about to do so then move to the left hand side of the next line down.

Line 220 If the screen is about to be filled up then clear the screen and go to the top of the screen.

Line 230 Go back to line 50.

Line 240 — Line 290 Set up screen.

Line 300 — Line 450 Define new small letters.

Note Do not press the shift key when entering data, as this leads to upper case letters being produced . . . and we don't want that!!!

DAZZLE DAZZLE DAZZLE

This program, although simple, is quite effective and can produce quite stunning results. Just run it and see the result.

If you like, try altering it to change colours at random times . . . or even create a few simple sound effects.

Here is how it works:-

Line 10-30 set up shapes for use in program.
Line 40 clear screen.
Line 50 fill screen with pattern number 250.
Line 60 set up original coordinates and original directions of shape. The original positions are random (X and Y) whilst the original directions are not (X1 and Y1).
Line 70 select a random shape to place on the screen.
Line 80-100 check if shape is about to hit edge of screen. If so make the shape bounce.
Line 110 actually move the shape on the screen. Loop back to th eline 70.

```
10  PATTERNC#250,"FFFFFFFF"
20  PATTERNC#251,"EOEOEOEOEOEOEOEOEOEO"
30  PATTERNC#252,"1C1C1C1C1C1C1C1C1C1C"
40  CLS
50  FORA=0TO21:CURSORO,A:FORB=0TO34:PRINT
CHR$(250);:NEXTB,A
60  X=INT(RND(8)*25)+5:Y=INT(RND(8)*15)+5
:X1=1:Y1=1
70  R=RND(8):IFR<.6THENG=251:IFR<.3THENG=
252
80  CURSORX,Y:PRINTCHR$(G)
90  IFX=0ORX=35THENX1=-X1
100  IFY=1ORY=20THENY1=-Y1
110  X=X+X1:Y=Y+Y1:GOTO70
```

Sound Effects

Just run the following program to get 9 wierd sound effects.

```
10  SOUND4,1,0:FORI=1STOOSTEP-2:SOUND1,31
0+I+1,I:SOUND4,,I:SOUND1,1000-I*3,I:NEXT
:SOUNDO
20  SOUND5,3,15:FORI=110TO110STEP-70:SOU
ND3,I,10:NEXT:SOUNDO
30  SOUND4,0,0:FORI=1STOOSTEP-1:SOUND1,90
0,I:SOUND4,,I:NEXT
40  SOUND4,0,15:FORI=1TO15STEP.4:SOUND4,,
I:NEXT:FORI=1STOOSTEP-1:SOUND4,,I:NEXT
50  SOUND1,,15:SOUND2,,15:SOUND3,,15:FORI
=2000TO1175STEP-75:SOUND1,I:SOUND2,2220-
I:SOUND3,(IXOR100)+100:NEXT:FORI=1STOOS
TEP-1:SOUND1,,I:SOUND2,,I:SOUND3,,I:NEXT
60  SOUND3,,0:FORA=10000TO500STEP-330:SOU
ND3,A:SOUND4,3,15:SOUND5,3,15:NEXT:FORI=
14TOOSTEP-1:SOUND5,3,I:NEXT
70  FORI=510TO4000STEP200:SOUND4,3,15:SOU
ND3,I,9:NEXT:FORI=1STOOSTEP-.5:SOUND4,,I
:NEXT:SOUNDO
80  SOUND4,3,15:FORI=1TO20:SOUND3,RND(8)*
3000+500:NEXT:FORI=1STOOSTEP-.3:SOUND4,,
I:NEXT
90  SOUND5,3,15:FORI=1TO20:SOUND3,RND(8)*
3000+500:NEXT:FORI=1STOOSTEP-.3:SOUND5,,
I:NEXT
```